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The evolving human interface
Special Report on data communications terminals
Follows ID/32



In Depth
Executive support systems in action **ID/3**

The other shoe drops
1,200 laid off at STC/**97**

AT&T test net praised, gets expansion OK

By John Dix
CW Staff

PITTSBURGH — The first user to test the AT&T Information Systems Network switching system with fiber-optic links and remote modules has decided to adopt the network throughout its facilities, instead of using a broadband local network that it had been considering.

One of six controlled introduction sites for the ISN, the University of Pittsburgh is pleased with the performance of the AT&T Information Systems product and will go ahead with plans to expand the

See **ISN** page 10

IBM Cabling System falls short of mark, user says

University calls prototype system costly, bulky, considers scrapping campuswide installation

By John Dix
CW Staff

PITTSBURGH — An early user of the IBM Cabling System has found the building wiring scheme to be overly space-consuming and expensive — factors that may lead it to abandon plans to use the system in 30 other buildings on its campus.

Carnegie-Mellon University here installed a prototype Cabling System approximately a year and a half ago in a building it was constructing to house its computation center, administrative programming group and information technology center. The last is a joint venture between the university and IBM to develop workstations for educational and research environments.

The four-story structure was wired to Cabling System specifications with cable that IBM donated, said Tom Bajzek, interim director of the computation center. Following the configuration plans, each of the roughly 100 offices in the building was equipped with an outlet that provides separate interfaces for voice and data devices. The outlets are wired in a star topology to wiring closets on each floor, which are, in turn, wired to a central distribution frame in the computer room.

As a prototype, the cable used in Carne-

See **CABLING** page 4

TOP OF THE NEWS

It's a deal. IBM cleared the final hurdle in its $1.26 billion acquisition of Rolm Corp. when both companies agreed to a U.S. Department of Justice mandate to divest Rolm's military computer business. Justice also said it sees no antitrust implications in the remainder of the proposed acquisition. **Page 2.**

■

View from the top down. To head off a crisis where time and money would have gone into incompatible systems and duplicate data, the U.S. Nuclear Regulatory Commission took a top-down approach to reorganizing its DP operations. **Page 6.**

■

Where's the disk? That's what the U.S. Geological Survey has been asking about an optical disk system it has been expecting for more than a year from troubled Storage Technology Corp. **Page 13.**

■

One-fourth of large software systems under development will be canceled before completion, and three-fourths will experience serious operational difficulties, according to statistics gathered from 200 Fortune 1,000 companies. **Page 14.**

■

Harris Corp. has unleashed a pair of 32-bit AT&T Unix-based workstations said to deliver more than one-half million instructions per second of processing power and aimed at engineering and software development applications. **Page 81.**

Users eyeing MVS on 4381 processor

Shops try various paths around virtual storage roadblocks

By John Desmond
CW Staff

PARMA, Ohio — To convert, or not to convert: That is the question for David A. Seman, who, as DP director at Parma Community General Hospital here, has been agonizing over whether to migrate to the MVS operating system when his IBM 4381 mainframe is installed in February.

MVS would free up some precious virtual storage on the hospital's 4341 Model Group 2 running on DOS/VSE under VM, but it costs more. Meanwhile, Se-

See **CONVERT** page 8

FYI

Prototype net ties Defense systems

By James Connolly
CW Staff

WASHINGTON, D.C. — Five miles of cable running along the walls and through the steam tunnels of the sprawling maze known as the Pentagon are linking U.S. Army office systems produced by seven different vendors.

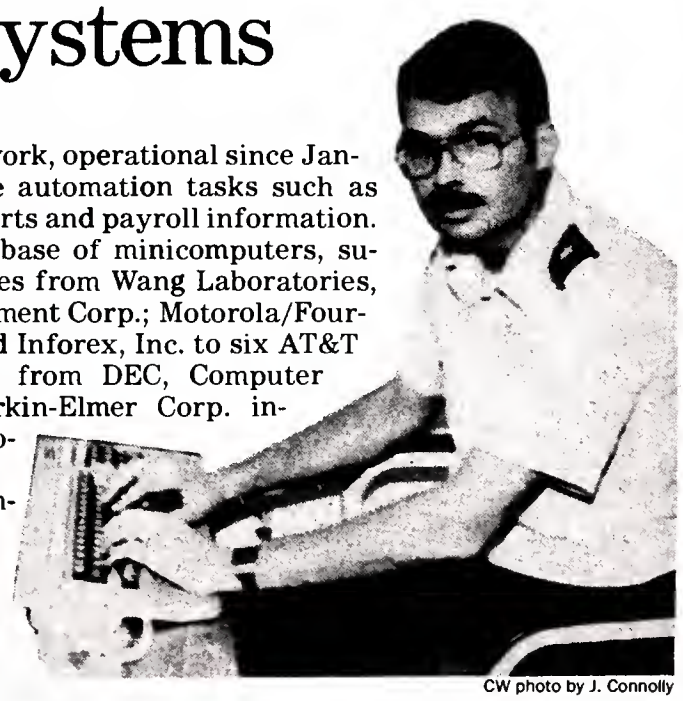
Army officials hope the prototype, a mongrel local-area network, will set a de facto office communications standard for other Army commands and branches of the U.S. Department of Defense.

"We are looking to provide a totally integrated office system for the headquarters of the Army. We want to provide more accurate communications, to move information faster, to improve the efficiency of mid-level officers and to better process secure, classified materials," said Lt. Col. Patrick C. Lanpher, project manager for the Headquarters Integrated Office System. The network, operational since January, is used for office automation tasks such as handling personnel reports and payroll information.

It links an installed base of minicomputers, superminis and mainframes from Wang Laboratories, Inc.; IBM; Digital Equipment Corp.; Motorola/Four-Phase Systems, Inc.; and Inforex, Inc. to six AT&T Unix-based superminis from DEC, Computer Consoles, Inc. and Perkin-Elmer Corp. installed under the prototype project.

But in addition to connecting normally incompatible systems from varied vendors, the Army brought in two different local-area

See **ARMY** page 8



CW photo by J. Connolly

NEWSPAPER

IBM, Rolm OK sale of unit

Justice Department approval of IBM's Rolm acquisition contingent on divestiture of Rolm military computer business

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The Department of Justice last week said it would not oppose the acquisition of Rolm Corp. by IBM, provided that the two companies consent to the divestiture of Rolm's military computer business.

Reacting to a civil antitrust suit brought by the Justice Department and to a proposed settlement of the action filed simultaneously Nov. 20 in U.S. District Court here, IBM and Rolm agreed to the divestiture terms specified by the government.

The Justice Department said it reviewed other aspects of the proposed acquisition announced in September, particularly IBM's acquisition of Rolm's private branch exchange business, and concluded that there was insufficient legal basis for challenging those aspects of the acquisition.

IBM to find buyer for Rolm division

As part of the divestiture settlement, subject to a 60-day public comment period, IBM will have six months to find a buyer for Rolm's Mil-Spec Computer Division, which reportedly accounted for 15% of Rolm's $660 million in revenues last year.

The Department of Justice said the challenge to IBM's $1.26 billion takeover of Rolm, brought about two days before Rolm stockholders were to vote on the takeover issue last Wednesday, was prompted by concern that the acquisition would "substantially lessen competition" in the military specification (mil-spec) commercial market, where the manufacturing and sales "are highly concentrated." Rolm had $75 million in mil-spec sales in 1983, which accounted for 50% of total mil-spec sales, according to the suit.

Meanwhile, Rolm stockholders at the company's annual meeting voted overwhelmingly to approve the takeover by IBM, depsite the Justice Department's consent decree forcing the divestiture. The vote, IBM said, consummated the merger, adding that Rolm is now a wholly owned subsidiary of IBM.

Assistant Attorney General for Antitrust J. Paul McGrath said in a prepared statement that between 1980 and 1983, Rolm and Norden Systems, Inc., a subsidiary of United Technologies Corp. of Hartford, Conn., accounted for 80% of total annual domestic sales of mil-spec computers, which are manufactured to withstand the rugged environments of military use.

The antitrust suit said there were "substantial barriers" to entry in the mil-spec commercial-based market and that IBM "was by far the most significant of, at most, a few potential entrants" into the market. Additionally, Justice Department lawyers, reviewing the proposed acquisition, found IBM "intended to enter this market and to commence taking orders in 1985."

Other reasons cited in the Justice Department suit noted that many of IBM's commercial products are currently used by the military and that its own mil-spec business, while not based on commercially available architectures and software designs, would give it "unique and significant advantages" in the commercial mil-spec market.

Rolm manufactures mil-spec commercial computers under a series of licenses from Data General Corp. of Westboro, Mass., that are software-compatible with commercially available DG products [CW, Oct. 15].

The Justice Department complaint challenging the Rolm acquisition noted, "it would be unrealistic to expect meaningful competition to exist between IBM and the [Rolm] Mil-Spec Computer Division. Instead of gaining a new competitor, the military would still have only two major firms to vie for its business," the department brief said.

Following the announcement of the proposed divestiture settlement, IBM said, "IBM and Rolm disagree with this contention but have agreed to divest so that the companies might proceed. IBM believes the divestiture in no way diminishes the value of the [Rolm] acquisition to IBM."

If IBM is not able to complete the sale of the division within six months, the proposed final judgment provides that a trustee appointed by the U.S. District Court will be responsible for finding a buyer, which IBM will have to accept.

McGrath said the object of the Antitrust Division was the preservation of the Rolm Mil-Spec Computer Division or its successor "as a significant participant in the market for mil-spec commercial-based computers."

Phillip Verveer, a former Justice Department official who served in the Antitrust Division when it was pursuing its monopoly antitrust suit against IBM, called the department's action "not so surprising, because the department has shown it is amenable to negotiated arrangements where spin-offs of certain assets are required as a condition of approval.

"This action will probably not diminish the department's willingness to let IBM compete aggressively in the markets it decides to enter, and it sounds like in this instance [the department] expects IBM to enter the military computer market," Verveer added.

CW West Coast correspondent Jeffry Beeler contributed to this report.

CORRECTIONS

The correct address for American Business Computer [CW, Oct. 31] is Suite 418, 16000 W. Nine Mile Road, Southfield, Mich. 48075.

"Trends in Information Technology: 1985," a handbook for executives from Arthur Andersen & Co., [CW, Nov. 19] will be updated annually, not monthly as previously reported.

Mark Williams Co.'s C Programming System, a C compiler and source debugger for Microsoft Corp. MS-DOS 2.0 environments [CW, Nov. 5], is distributed by Control-C Software, Inc. of Portland, Ore., but is also available directly from the supplier for $495. Mark Williams is located at 1430 West Wrightwood, Chicago, Ill. 60614.

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NEWS SUMMARY

SPECIAL REPORT
Data communications terminals **Follows ID/32**

Long-distance rates will drop further if a proposed residential-access charge plan is approved by the Federal Communications Commission/**4**

The Nuclear Regulatory Commission took a top-down approach to reorganizing its DP operations/**6**

IBM's recent announcement of the 4381 Model Group 3 opens up options for 4300 series users considering conversion to MVS/**8**

Storage Technology Corp. has repeatedly failed to deliver equipment to the U.S. Geological Survey, which is seeking to become an STC beta-test site/**13**

Industry expert T. Capers Jones III recently offered a pessimistic view of domestic software quality/**14**

Despite IBM's apparent neutrality concerning centralized networks, it reportedly is still promoting centralized control within corporate DP departments/**15**

In the horticulture business, efficient order processing makes the difference between sales and spoilage/**16**

One factor was evident at a recent software job fair: Entry-level job seekers need not apply/**17**

CW at Computer Security Conference: Strategic planning is the key to ensuring computer security . . . Small-systems users need policies and guidelines to help maintain the security of those systems/**22-23**

TV ads for software are playing to mixed reviews/**24**

Getting a return on an investment in office automation is hard to quantify/**27**

CW at RPI AI Meet: A valid definition of artificial intelligence has been lost amid industry jargon . . . To benefit from AI, an organization must first develop a strategy for adopting the technology/**28-29**

Eight New York banks are linking their automatic teller machines to form a single network/**30**

Without sophisticated systems integration, an MIS director's job is an impossible one/**32**

Crime reporting requirements in one state recently served as the test vehicle for the state university's new data base management system/**34**

Computer modeling techniques are being used to identify and prevent marital conflict/**35**

UK firms are plagued by misguided DP purchases/**36**

An IBM-compatible portable led the product offerings from international vendors at Comdex/Fall '84/**40**

At the recent Comdex/Europe, the keynote speaker had a gloomy forecast for the future of Europe's high-tech growth/**44**

IN DEPTH
Support systems for executives/ **ID/3**
Evaluating micro-based systems/ **ID/17**
Trends in software protection/ **ID/27**

Washington Update/**12**
International Report/**46**
Turnaround Time/**47**
Calendar/**56**

EDITORIAL/58
SOFTWARE & SERVICES/63
COMMUNICATIONS/77
SYSTEMS & PERIPHERALS/81
MICROCOMPUTERS/89
COMPUTER INDUSTRY/97

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NEWS

Access charge OK may prompt AT&T rate cut

WASHINGTON, D.C. — A 6.5% long-distance rate reduction by AT&T Communications is expected next year following disclosure of the latest federal and state plan to levy a residential access charge of $1 per month that will help defray the local rate subsidy currently paid by carriers.

Additionally, state utility commissions may be empowered to levy an additional 35 cent fee on top of the residential access charge if it can be shown that large communications users have plans to bypass the local telephone company. Also the plan contains provisions that would permit state public utility commissions to grant "discounts" on the $6 multiline business access fees currently in effect for large businesses if it can be shown they are constructing bypass facilities.

These features of a federal and state plan were approved by a specially convened joint board Nov. 15 and sent to the Federal Communications Commission, which is expected to approve them Dec. 19.

Charge to raise estimated $2 billion annually

Ronald Choura, a Michigan public utility commission employee, estimated that the $1 a month residential access charge, which will also be applied to single-line business customers, will raise $2 billion annually, of which $1.8 billion could be applied toward "dollar-for-dollar" reductions of AT&T Communications' costs of $28 billion, or approximately 6.5%.

FCC Chairman Mark Fowler asked that the proposed plan be given a fair hearing by Congress, which in the past has raised objections to any access fee levied on consumers.

Originally, the FCC proposed a $2 monthly fee for residential customers that would have risen to $4 maximum.

The new joint board recommendation to levy a $1 monthly fee, if approved by the FCC, would go into effect June 1985 and rise to $2 in June 1986, where it would be frozen. The joint board also recommended that the access fee for Centrex customers who were using the service before July 27, 1983 be retained at $2 per line per month.

CABLING from page 1

gie-Mellon's system varies slightly from the commercial version now available. Bajzek said their version has only three pairs of twisted-pair wire for voice applications, rather than the four now included. The director believes IBM increased the number of pairs in the commercial cable — which also contains two shielded twisted-pair wires for data applications — to accommodate AT&T's System 85 private branch exchange (PBX).

The university does not presently use the voice copper pairs in its cable for that application. The reason, Bajzek said, is because the university is a Centrex customer and the Cabling System was installed before it became legal to own internal telephone wiring. Carnegie-Mellon's voice pairs are currently used to support RS-232 connections but probably will be retrofitted for voice when the university turns out Centrex for a PBX.

'I don't think that we would have considered the Cabling System if IBM hadn't said that this is where IBM networking is going.'
— Tom Bajzek, Carnegie-Mellon University

While the Cabling System in this building has performed admirably and provided flexibility in the installation and relocation of equipment, lessons learned here have made the university think twice about using the system throughout its campus.

The cable itself is inflexible and bulky, Bajzek said. It is similar in size to a 25-pair key set wire, or roughly ¾ in. in diameter. On floors with many offices, "this amounts to a massive load of cable running back to the wiring closet," he noted.

The bulk of the wire and the need for wiring closets creates a space problem. To wire the campus with 10,000 outlets to support roughly 6,000 to 7,000 workstations would require the university to convert about 40 offices and dormitory rooms into wiring closets, Bajzek estimated.

The wire's bulk also contributed to installation expenses. It cost about $100,000 to wire Bajzek's building as it was being built, or roughly $400 per outlet. Extrapolating these figures, taking into consideration the fact that it will cost more to wire existing campus buildings, Bajzek projected it will cost roughly $7 million to $9 million to wire the university with the Cabling System, or about $700 per outlet.

This is two to three times what Carnegie-Mellon had initially predicted it would cost to wire the campus with wide bandwidth communications facilities, an estimate that was made before the Cabling System was announced. The cost is so high, in fact, that the university is now considering alternatives.

One option is to install an Ethernet local network for data and to wire separately for a voice system. Bajzek thinks this alternative would be cheaper but not substantial enough to make the decision simple. In either case, telephone wire throughout the campus will have to be replaced because its placement is poorly documented.

A technology that was not considered as an option was combining voice and data support on a PBX. Bajzek said he did not believe that a PBX could deliver the megabit speeds that he anticipates will be needed in the future. Diskless workstations, for example, may require such high-speed network connections, he said.

The fact that future bandwidth requirements are unknown is an important thought in a plan of this sort, Bajzek noted. "This is a long-term investment, and one thing we don't want to do is sell ourselves short and buy a network that doesn't have enough bandwidth for the things that we might want to do later."

In the Cabling System's favor is IBM's statement of intent to build a token-passing local network that will be based on the wiring scheme. "I don't think that we would have considered the Cabling System if IBM hadn't said that this is where IBM networking is going," Bajzek said. In the interim, the university is using a Proteon Associates, Inc. Pronet token-ring network on the Cabling System installed in its first building.

The Pronet is used mostly in a Digital Equipment Corp. Decnet to support six of the computing center's Decsystem-20s and VAX-11/780s for host-to-host communications. Bajzek said that Proteon has assured him that it will be compatible with IBM network products when they are announced. He anticipates, however, that initially the networks will have to be operated separately and connected by drivers.

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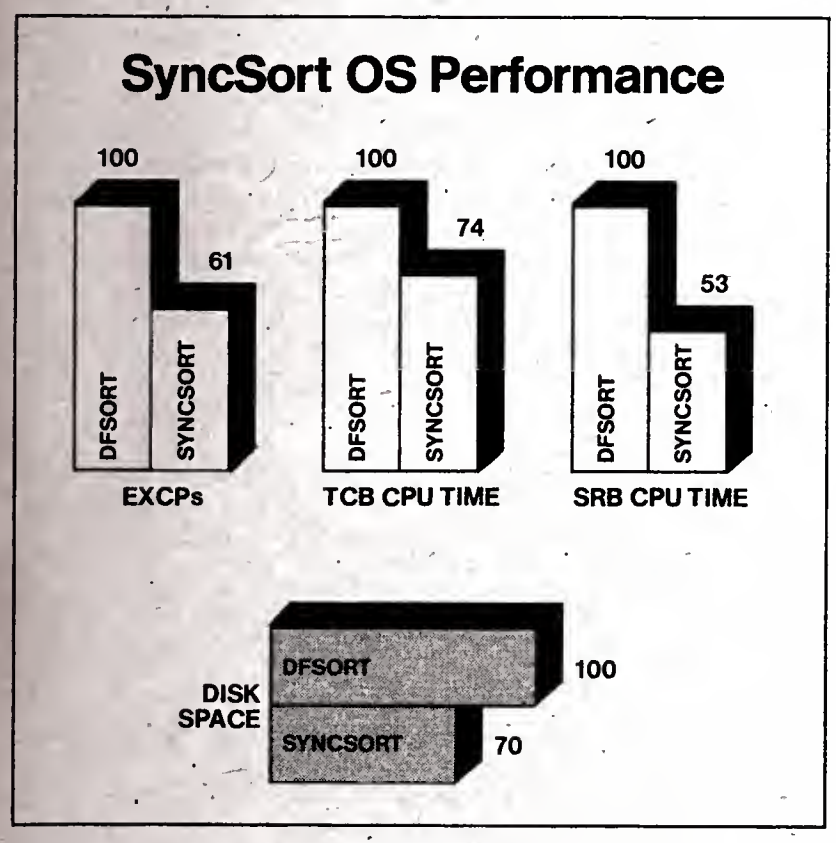
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Shake-up streamlines NRC's DP functions

By James Connolly
CW Staff

BETHESDA, Md. — An agency that licenses nuclear power plants could not afford to stow potentially life-saving information in local computers, where those who needed it did not know about it or could not access it through their own systems.

By reorganizing with a top-down management approach, the U.S. Nuclear Regulatory Commission (NRC) headed off a crisis where time and money would have gone into incompatible systems and duplicated data. Now, the NRC has started work on an agencywide shared data base, has limited redundant programming and is directing microcomputer spending at approved equipment and software.

The agency, with 3,400 employees spread throughout the Washington, D.C., area, five field offices and about 60 nuclear power sites, has 50 data processing workers to maintain equipment, train users and coordinate time-sharing services and contracted software development.

In 1982 the NRC reorganized its DP operations, replacing a system where individual users too often called the shots for equipment purchases and program development.

"Before all of this, all system development was from the bottom up instead of from the top down. We would go into an office, and everything would be office-specific. We were too customer-specific," reported Harold S. Bassett, director of automated information services.

NRC formed a steering group to cope with limited resources, technological advances and end-user computing. The committee, made up of executives and DP managers, advises management on computer purchases and policies.

Bassett said that in 1982, the NRC was like other agencies and corporations — plagued by a yearlong backlog for application development and subject to demands for microcomputers. The agency imposed a limited moratorium on application development, allowing only what Bassett termed "very, very important" programs.



CW photo by J. Connolly

Harold Bassett (left), director of the NRC's automated information services, and James Shields, chief of the NRC's systems support branch.

But the agency, spun off from the Atomic Energy Commission in 1975, had no mainframe, and thus, no central data base. Developing that data base, whether on a purchased, time-shared or service bureau mainframe, is one key to the ongoing reorganization.

The bulk of the NRC's processing is done on Data General Corp. minicomputers located throughout the U.S., handling administrative tasks such as personnel and payroll. One machine does small-scale scientific modeling, and another is being installed in an operations center that was inspired by the 1979 emergency at Pennsylvania's Three Mile Island facility.

"Back then, we were in the 3- by 5-in. cards tacked to the wall era. We were somewhere between the Pliocene and Miocene ages then," said Bassett of the Three Mile Island crisis. During an emergency or test, the operations center's DG MV6000 will track information such as weather conditions, radiation dose assessments and construction details about the specific plant.

The agency maintains two time-sharing agreements, one for complex scientific projects running on the U.S. Department of Energy's Control Data Corp. Cyber 205 supercomputers and another for management applications on the National Institutes of Health's IBM 3084 mainframes.

The institute's system will host a pilot project giving the NRC commissioners executive-level tools such as vote-tracking and scheduling.

The agency also has developed a network of 21 IBM 5520 office automation systems that access the institute's mainframe and handle word processing and document transfer tasks. In the field, plant inspectors write reports on personal computers and transmit them to the 5520s for editing.

Like other organizations, the NRC was faced with controlling the proliferation of microcomputers.

"At the end of fiscal year 1983, we had two personal computers in the agency. By the end of calendar year 1984, we will have more than 200, and by the end of next year we will have 300," Bassett said.

But to ensure compatibility, the agency now supports only micro software approved by the steering group. The agency is testing or has approved project management, spreadsheet, data base management, word processing and communications packages for various types of users, most of whom use IBM Personal Computers and compatibles.

Hands-on training on those packages, the 5520s, personal computers and the other NRC systems is being handled in a training laboratory run by the U.S. Department of Agriculture and in a support center recently opened here. More than 450 employees applied for 200 seats in the classrooms.

"Recognizing that a service organization's work never ends, our plans for the corporate information environment see about three to four years into the future. We conservatively estimate that by that time NRC will have a workstation-to-staff ratio of roughly 1:2. In a phased fashion between [fiscal year 1985] and [fiscal year 1989], our users will be able to access and share information from all our major data bases utilizing marketplace technology," Bassett said.

Shared data base key part of NRC's DP reorganization

BETHESDA, Md. — The most ambitious thing in the Nuclear Regulatory Commission (NRC) DP reorganization is the development of a shared data base that will allow access for users across the country, according to the commission.

Harold S. Bassett, director of the division of automated information services, said typical data in the shared system would be information explaining how pipes crack, how they can be repaired and the legal and emergency procedures to be followed whenever an emergency occurs. More specific details could be in the data base but accessed only by technical specialists dealing with a particular power plant.

The NRC, which will build general and restricted data base prototypes in the spring, plans to acquire a fourth-generation data base management system, a system the agency hopes to have fully operational in three years.

"What we are doing is using [Mathematica Products Group, Inc.'s] Ramis II on the Natiónal Institutes of Health mainframe to introduce our users into a fourth-generation software environment that will be a bridge to our own data base management system," Bassett said. Ramis II is used to maintain information such as license amendments for the nation's nuclear power plants.

But at present, the NRC does not have a computer on which to run the shared data base. Bassett said the options appear to be an expansion of NRC's time-sharing agreement with the National Institutes of Health, contracting with a service bureau or acquiring a mainframe.

Access to the planned data base will be through IBM 3270 terminals, personal computers and IBM 5520 OA systems that emulate 3270s.

This month, the NRC will begin to analyze and categorize its data to determine what information should be shared agencywide and what data should be accessed only by specialists. Part of that effort will be to identify which employees should have access to data and, of greater importance, which employees are responsible for maintaining data, Bassett said. "I don't think we will find any big holes when we lay out all of the data. I think all of the information is there. It's just a matter of reconstituting it so we can use it," Bassett said.

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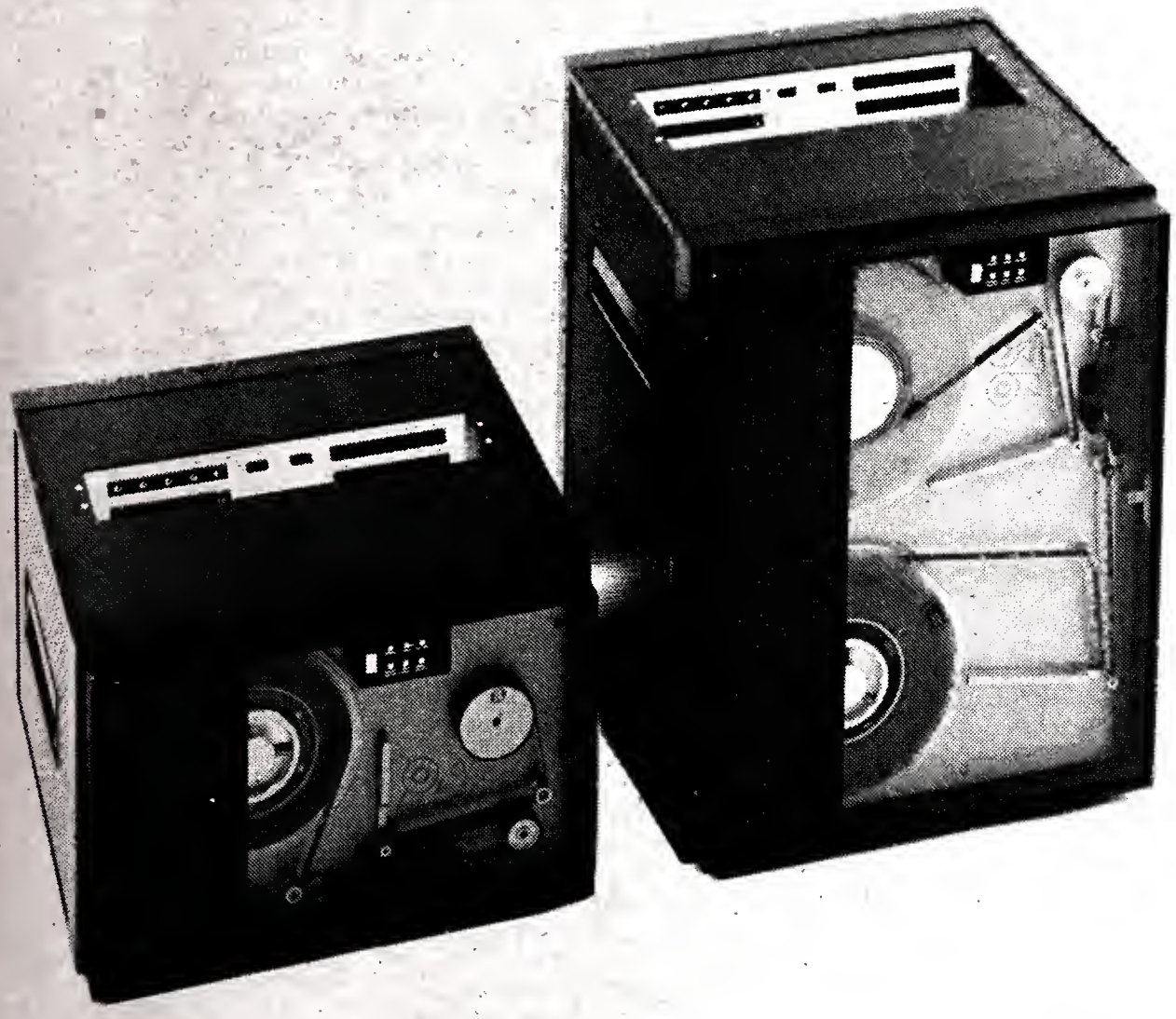
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CONVERT from page 1

man has been able to delay his decision with some imaginative moves to give himself more virtual storage, deflecting some "very aggressive" marketing by IBM in the process, he said.

"IBM has a big push on to get users into the 3083 and MVS. That's across the country. Everywhere I've been going, I've been hearing that," Seman said. But because he suspected that a dual-processor 4381 would be released, Seman has been reluctant to go to the 3080 series. His intuition proved correct, since IBM announced the 4381 Model 3 in October [CW, Oct. 29]. "It doesn't make sense for me to go to a 3083, with the 4381 dual processor coming out," he said.

For many mid-range IBM shops, the recent announcement of the high-end 4381 presents an option that previously was not attractive. The Model 3's high performance now makes it practical for 4300 series users to convert to the MVS operating system without having to buy into the bigger and more expensive 3080 series mainframes. However, the choice presents both advantages and disadvantages to users.

Analyst Dave Moschella of International Data Corp. (IDC), a market research and consulting firm located in Framingham, Mass., said prior to announcement of the 4381 Model 3, "running MVS/XA on the 4300 series was not a good idea," because the operating system occupied so much of main memory. IDC is predicting that IBM will cut prices on the 3080 series X models before year's end to counteract the price-performance gap with the 4381 Model 3, Moschella said.

The cost of MVS is the main disadvantage. Seman said it would cost him $5,000 more per month in licensing fees to run MVS and $15,000 more per month to run MVS/XA, which, he said, IBM is advising him he needs. An advantage of MVS for Seman would be added virtual storage. "We keep running out of virtual storage," he said. "I don't know if we can stay where we're at. But every time we go to make a conversion to MVS, we find a way around it." For example, he recently acquired a data base management system from an independent software vendor that takes the place of his Vsam files, freeing some virtual storage and buying him some time.

John Sawilchik, technical support manager in the DP department at the Robert Bosch Corp. of Broadview, Ill., an automotive replacement parts seller, is trying to weigh the greater performance of MVS against its cost. He was told by IBM that his 4381 will operate at only 80% efficiency without MVS. "You have to balance that with higher software costs," he said. The software costs, though he did not have specific prices, would be 10% to 15% higher than what he is paying now, in addition to the cost of converting his applications.

> *'The biggest fear everyone has is being left out of the mainstream of operating system development. You don't follow the trunk of the tree, but you don't get too far out on the limb either.'*
> — Tom McGinley, Epsilon

Sawilchik, whose shop installed a 4381 Model Group 2 in October, is leaning toward a move to MVS from DOS/VSE under VM. At a recent seminar in Chicago, he said IBM was offering the first six months of MVS free if the system was bought in 1984. "If you were on the verge of making a decision, that might push you over," he said.

For another user who has already decided to move to MVS software, the 4381 Model 3 announcement resulted in hardware savings. Tom McGinley of Epsilon in Burlington, Mass., a marketing and data base firm serving Fortune 1,000 firms, recently decided to upgrade to a 4381 Model Group 3 instead of converting to the 3083 EX model. The firm currently has four 4341s and two 4381s powering 300 terminals serving clients in the field and 100 terminals running IBM's CMS internally.

Epsilon needs room for expansion, McGinley said. The 4381s now running OS/VS1 will be converted to MVS/SP in the spring. "It was something we recognized we had to do," because OS/VS1 was no longer being updated by IBM, McGinley said.

But when converting from National Advanced Systems, Inc. mainframes last spring, Epsilon opted for IBM 4381s instead of a 3080 series X model, in a gamble that IBM would announce a higher end 4381. The gamble paid off when the Model 3 was announced because that CPU provides an estimated millions of instructions per second rate equivalent to the low-end 3080 series. "The savings was $600,000 per processor," McGinley said.

Epsilon was attracted to MVS for its greater power, although McGinley said he has some doubts. "Are you just pushing data around or are you getting processing done?" he asked. But staying current is an overriding concern for Epsilon. "The biggest fear everyone has is being left out of the mainstream of operating system development. You don't follow the trunk of the tree, but you don't get too far out on the limb either," McGinley said.

Another analyst says the decision on whether to convert to MVS or MVS/XA depends on a user company's long-term plans. Michael Geran, vice-president of research at E.F. Hutton, Inc. in New York, said, "MVS/XA is where IBM is going. Users will have to convert eventually, but a number of interim steps can be taken" to delay conversion. Users who are processing their applications on time and who have enough virtual storage can delay the conversion to MVS, he said.

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ARMY from page 1

networks.

Personal computers, terminals and printers are linked to each other and to individual hosts through a Sytek, Inc. Local Net broadband local-area network. The hosts are connected to each other through a 5M bit/sec Ungermann-Bass, Inc. Net One local-area network.

Lanpher noted that the Army saved $300,000 on the 450-terminal prototype by having its own personnel run the cabling last year.

"The majority of the work was in developing software for the interfaces," he added. The networking software, including a virtual circuit handler for each terminal, and the networking configuration were developed by the Johns Hopkins University Applied Physics Laboratories. But little of the other equipment and software was customized.

Throw out baby with bathwater

"We are using off-the-shelf products wherever possible and are retaining our installed base wherever possible. The last thing we want to do is throw out the baby with the bathwater by developing a system that requires all new equipment. We had the basic concept, and we said we wanted to use standard, off-the-shelf equipment and software," Lanpher noted.

He said the prototype concept with generic products is more flexible than the Army's traditional DP approach, where it would have contracted for a complete system based on expected needs, such as the tolerable number of packet collisions, speeds and capacities. He noted that the traditional approach would have meant several years of installing a complete network and then analyzing the functionality.

Analyses of the prototype — one of which is now being completed by Control Data Corp. — can be used to define more clearly the Army's functional needs, such as a payroll application, which may not be as clear-cut as those of a corporation, Lanpher said.

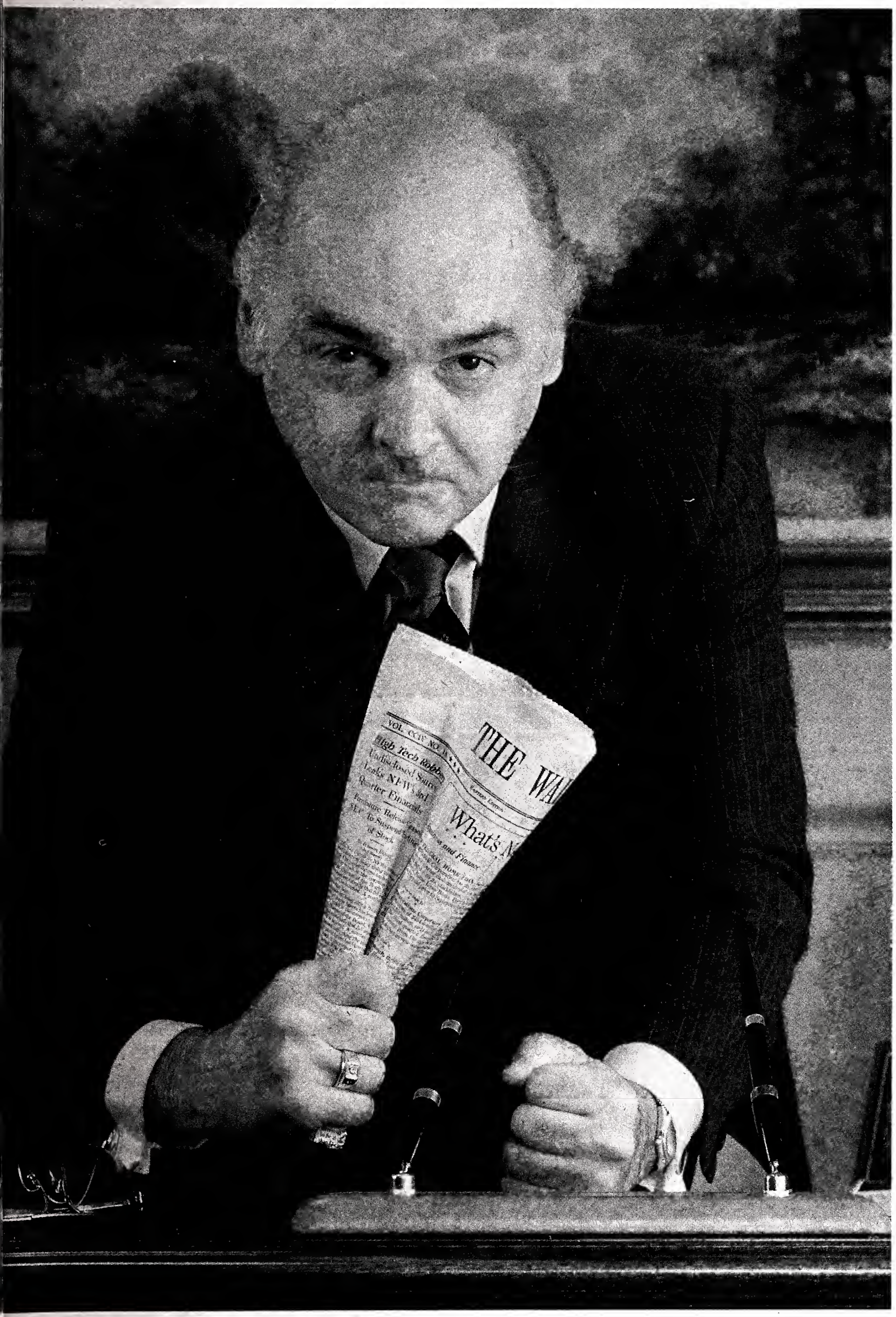
Hios sent 1,100 questionnaires to users in eight Army agencies. "We got back 700, with 400 of those saying they used Hios often. This whole process of evaluation is very complex, but we were very pleased to get such a good response to a questionnaire," Lanpher said.

"We not only asked the users which applications they were using but which ones they weren't using," he added. "What we know already is that we need to do a better job in getting them up and running. We are developing an application team — people who can go around and say to the user, 'OK, you know how to use it as a basic tool. Here is how you can use it to do your job better.' " Users cited some technical problems but said they would be highly satisfied with Hios if those bugs were removed, according to Lanpher.

Hios, which follows the International Standards Organization's Open System Interconnect model up to the Level 4 transport layer, could grow to 1,200 terminals if made permanent next year, but it also could lead to Army posts around the world setting up compatible office networks linked to each other through the Pentagon's Defense Data Network.

Lanpher said developers of Hios have consulted with U.S. Navy and Air Force systems developers in the hope of establishing interservice systems compatibility.

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School's ISN net only one part of larger, long-term plan

The University of Pittsburgh's migration to a fully integrated data communications network based on AT&T's Information Systems Network (ISN) is part of a larger plan to lace the school with fiber optics and install a new voice system.

Collectively, the systems being put in place are part of the school's so-called "campus of the future" project. The idea was born two years ago of the desire to replace the university's Centrex service with a private branch exchange (PBX). This eventually led to the idea integrating the school's voice and data systems through a campuswide fiber-optic network, creating, in effect, a campus utility.

The $8 to $9 million project calls for a fiber network that will interconnect more than 30 buildings, a multiple node AT&T ISN and an 11,000-line AT&T System 85 PBX, according to David A. Forejt, associate vice-president for computing and telecommunications. Both the System 85 and the ISN will have modules distributed around the campus and interconnected by fiber.

Installation of a 12-fiber ribbon cable in the school-owned conduit began this month. While both the System 85 and the ISN will share the cable, voice and data will not be integrated over the same individual fibers. The only data traffic the System 85 will carry, in fact, is that modulated by end users with modems.

In the first phase of the fiber network installation, the university's five main user centers — each containing 30 to 60 terminals or personal computers that emulate terminals — will be wired into the ISN.

Beginning early next year, the first System 85 components will be connected to the net, and by March 1986, both systems are expected to be fully operational.

But the university has more in store for the fiber net than carriage of just voice and data. In 1985, the school will begin experimenting with video systems, with the idea that eventually the fiber network can be used to deliver visual material to the classroom to enhance lectures, Forejt said.

Enough fiber will be installed to support this type of application, even though the university does not yet have a firm idea of how the system will take shape, Forejt said. "We have to do an extensive needs analysis," he said. By early 1986, the school hopes to have an automatic video switching system that will enable professors to access needed material from a central depository.

ISN from page 1

network across its campus, according to Paul Stieman, director of the university computer center.

When completed next September, the ISN will include eight nodes and 29 concentrators, providing host support for roughly 450 remote asynchronous terminals and personal computers. End-user devices will be attached to the network through RS-232C interfaces using copper twisted-pair wire. Network components will be interconnected through a fiber-optic backbone network the university is installing (see related story above) and T1 microwave facilities.

The basic design objective, according to Don Salvin, data communications supervisor at the university, is to provide the school's terminals with increased connectivity to their host processors while reducing the complexity of the network configuration. The university has two triprocessor Digital Equipment Corp. Decsystem-10s, a uniprocessor Decsystem-10, two DEC VAX-11/780s, a VAX-11/785 and a National Advanced Systems Corp. (NAS) 8050.

Terminals in five centers

To complicate matters, the terminals on campus — most of which are located in five centers but some of which are scattered over the campus — are six miles away from the university's computer center. These locations are connected with a 12-GHz Sanbar CE-1130 microwave radio system that provides a T1 digital link operating at 1.54M bit/sec.

Today, the T1 radio capacity is divided into multiple channels with General Datacomm Industries, Inc. Megamux multiplexers. These channels are used to connect communications processors and multiplexers at the computer center with complementary processors and multiplexers on campus.

The university's two academic Decsystem-10s, for example, share a DEC PDP-11/50 set up as a front-end processor, which, through the T1 link, supports four remote PDP-11/34s to which terminals are attached. The school's three academic VAX systems, on the other hand, are multiplexed through a Rixon, Inc. DCX 850 statistical multiplexer to three remote Rixon systems that provide terminal interfaces.

The administrative Decsystem-10 is configured like its counterparts — with a PDP-11/50 front end supporting terminals through two remote PDP-11/34s — but the administrative NAS 8050 is unique. This IBM-compatible mainframe sits behind an NCR Corp. Comten 3690 communications processor that supports, through bridges and the T1 radio, a remote Ungermann-Bass, Inc. Net/One local net.

The front-end Comten is loaded with protocol conversion software enabling the use of asynchronous terminals with the NAS. Because the Net/One has a gateway to a local PDP-11/34 — as well as a direct connection to the NAS — users on campus can use the same terminal to access either administrative system.

Initially, the Net/One was installed as a test system with the idea that it might be used throughout the campus. Salvin said those plans were abandoned in favor of the AT&T system because the ISN "is more functionally capable than Net/One." While initially satisfied with the local net, Salvin reported that at higher speeds he was losing connections from board lockouts. He also noted that resetting communications parameters for a single terminal required taking down an entire board, which disrupted other users.

Those problems have not arisen with the AT&T ISN. The single-node ISN was installed in September in one day, cut over within three days and has not since experienced any hardware or software failures, Salvin said.

This ISN node is presently being used as a terminal switch within the computer center to supplement the systems previously outlined. Eventually this site will be connected through three T1 microwave radio links to the campus, where roughly seven additional nodes will be placed. Campus nodes will be interconnected with the school's fiber-optic backbone network, which will also be used to link the nodes with roughly 29 concentrators. The concentrators can extend the reach and the number of devices supported by a single node.

See **ISN** page 11

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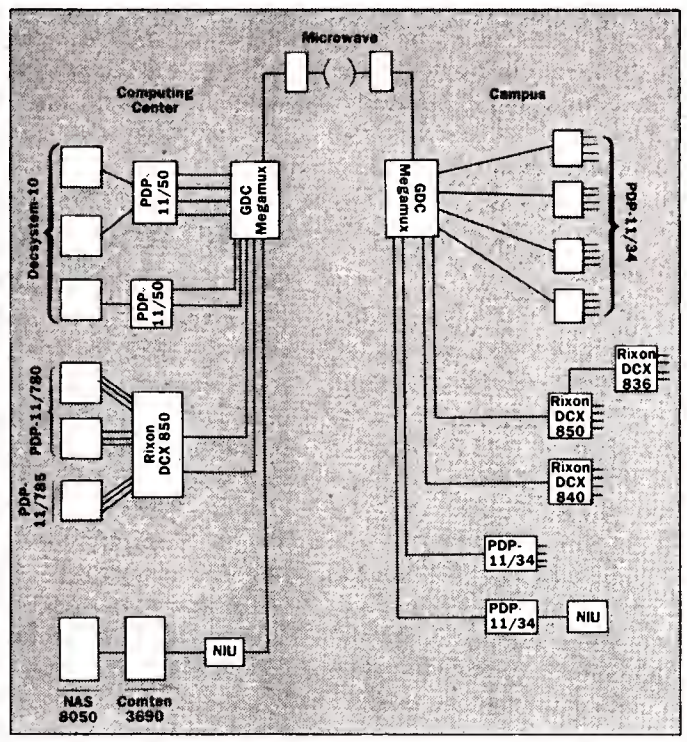
Completed AT&T ISN to tie campus systems

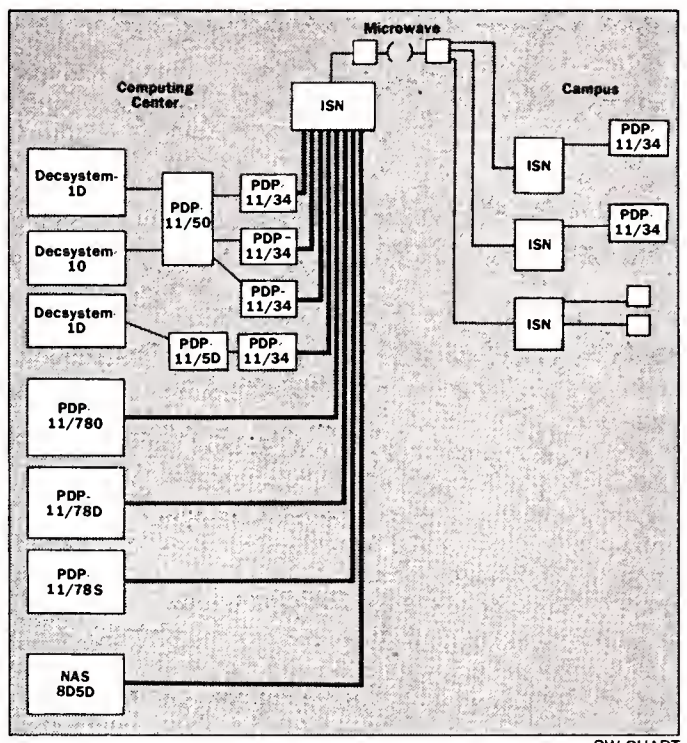
The University of Pittsburgh's computer systems, housed in a center in an office park six miles from the campus, are connected to the school by a 12-GHz 1.54M bit/sec microwave link. The diagram shows how the network is currently configured and how it will look when the complete AT&T Information Systems Network (ISN) is installed.

Today, the capacity of the microwave system between the two locations is divided into lower speed channels — from 19.2K to 56K bit/sec — using a General Datacomm Industries, Inc. (GDC) Megamux.

The Digital Equipment Corp. PDP-11/50, set up as a front end for the two uppermost academic Decsystem-10s, supports four remote PDP-11/34s that have multiple 1,200 bit/sec asynchronous ports. The other academic systems, the two DEC VAX-11/780s and the VAX-11/785, are connected to a Rixon, Inc. DCX 850 statistical multiplexer. The DCX 850, DCX 840 and DCX 836 on campus provide 2,400 bit/sec asychronous terminal support.

The administrative systems include the remaining Decsystem-10 — configured like the others — and a National Advanced Systems, Inc. (NAS) 8050. The 8050 sits behind an NCR Comten, Inc. 3690 communications processor loaded with protocol conversion software, enabling asynchronous terminals to be used on this IBM-compatible mainframe.





CW CHART

Those terminals are supported on campus through bridges by an Ungermann-Bass, Inc. Net/One broadband local-area network. The Net/One is also connected to the VAX-11/34 serving the administrative Decsystem-10 through a network interface unit (NIU), meaning local net users can access either system.

Use of the ISN will enable the GDC and Rixon multiplexers, as well as the Net/One, to be turned out. Four of the six PDP-11s configured as front ends will be moved back to the computer center as these machines are retired. Instead of the single T1 facility currently used to connect the locations, the ISN will use three 1.54M bit/sec links.

When completed, the ISN will enable terminal users on campus to access any system to which they have clearance.

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ISN from page 10

As the ISN is being completed, the General Datacomm and Rixon multiplexers will be turned out, as will the Ungermann-Bass Net/One, and four of the five front-end PDP-11/34s will be brought back to the computer center.

This will simplify the entire network configuration and its management, according to Salvin.

For the near future, hosts will be hard-wired to the ISN, but Salvin said that they are considering writing a VMS driver to support a host interface that would reduce both the hardware and the number of wires needed to connect the machines.

The completed ISN will be functioning like a data switch, similar in manner to the way the Rixon DCXs are currently used, Salvin said. The advantage is that the ISN is more expandable and can support high-speed host-to-host file transfers, the supervisor noted. The maximum speed supported on a DCX trunk is 56K bit/sec, he said, whereas the ISN can interconnect machines at 8.64M bit/sec, the operational speed of the short bus in each node.

Costwise, Salvin said, the ISN is comparable to competitive devices. David A. Forejt, associate vice-president for computing and telecommunications, put the figure at $350 per port.

The major complaint Salvin has with ISN is that its software is "relatively primitive."

For example, in the initial release "there is no way of determining what sites are busy, [and] which aren't," he said. Software that would provide site usage data is expected to be included in the multinode release, which AT&T has promised will be available shortly to meet the university's plans.

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Factory nets to be topic of sessions

WALTHAM, Mass. — C. Kenneth Miller, president of Concord Data Systems, Inc., based here, will be the featured speaker on local-area networks for factories at the Yankee Group's annual briefing sessions, "New Technologies; New Solutions."

Miller will discuss his company's Token/Net local-area net in a session titled "Factory Networks in Chaos."

The Yankee Group sessions will be held Dec. 4-5 at the Plaza Hotel in New York and Dec. 11-12 at Rickey's Hyatt in Palo Alto, Calif.

The registration fee for the briefing sessions is $875.

Information is available from the Yankee Group, 89 Broad St., Boston, Mass. 02110.

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NEWS

WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

Carnegie-Mellon site of DOD software center

WASHINGTON, D.C. — Carnegie-Mellon University in Pittsburgh recently won a high-stakes competition among universities vying to be the site of the Department of Defense Software Engineering Institute, which will develop and promote techniques for automated software production [CW, Sept. 24].

The Pentagon's selection of Carnegie-Mellon for the five-year, $103-million contract followed an intense lobbying campaign by the bidding universities and their political representatives. The bidders hoped the institute would attract high-technology industries to their locales.

The Pentagon said the institute will study automated software development tools that will help military software vendors lower their costs. Also, the institute is likely to develop interface specifications for advanced communications networks that permit assembly of reusable code modules developed at dispersed locations and develop criteria for the evaluation and validation of programming environments.

Board rules against bias in airline reservations

WASHINGTON, D.C. — The Civil Aeronautics Board (CAB), continuing its assault on bias in computerized airline reservation systems, recently ruled that the systems must be able to display up to nine connect points, or "hubs," for connecting flights.

The CAB said it acted because an airline-owned computer reservation system can limit the display seen by travel agents to the hub airports favored by that airline.

The final rule, effective Nov. 14, was opposed by Delta Airlines. Delta said that expanding the capacity of its Datas II system from five to nine points would require expensive hardware and software changes, because the system features on-line construction of connecting flights, rather than prestored connecting flights.

The CAB acknowledged that its rule may have a "chilling effect" on the innovative system, but said the rule was needed because of the anti-consumer and anticompetitive effects of the systems.

Board member Barbara E. McConnell dissented, calling the rule premature, arbitrary and burdensome for the airlines.

Panel urges government to raise research budgets

WASHINGTON, D.C. — A high-level science panel is urging the federal government to increase research budgets for supercomputers and educational hardware and software.

The National Academy of Sciences' Committee on Science, Engineering and Public Policy made the recommendations to both the White House Office of Science and Technology and the National Science Foundation, according to a recent announcement.

Supercomputers are critical to technological leadership in a range of applications from aircraft design to basic chemistry, the panel said. Specific recommendations included the following: continued support for development of parallel processing, appropriate software and new programming language concepts; strong support for artificial intelligence and efforts to speed the transfer of supercomputer research results into commercial production; and teaching U.S. specialists to read Japanese technical literature.

In addition, the committee said additional research is needed, particularly in artificial intelligence, to develop "integrated [computer] systems capable of interacting intelligently and sensitively with students."

FCC approves protocol service

WASHINGTON, D.C. — The Federal Communications Commission last week granted the divested Bell operating companies permission to perform X.25 and X.75 protocol conversions for asynchronous terminals as part of their tariffed local service functions.

The FCC said the divested Bell operating companies would not have to offer protocol conversion — considered an enhanced service — through a separate subsidiary, which current FCC rules require for services not considered basic. The carriers argued that it was "not economically feasible" to establish a separate subsidiary when protocol conversions are priced out of reach for low-volume users.

FCC Chairman Mark Fowler commented after the action that the divested operating companies will be permitted to offer "more efficient" use of their local-area facilities with the protocol conversions and that "rigid interpretations of the rules" should not be used to prevent new service offerings.

The divested Bell operating companies seeking to offer protocol conversion are Northwest Bell, South Central Bell, New Jersey Bell, New England Bell, Southern Bell, Southwestern Bell and Pacific Northwest Bell telephone companies.

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NEWS

STC fails to deliver beta-test storage system

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Financially troubled Storage Technology Corp. (see story, page 97) has repeatedly failed to deliver optical disk storage equipment sought by the U.S. Geological Survey (USGS), a large federal agency that is eager to beta test the equipment.

"We have been expecting the equipment for over a year, but it has never been shipped," Theodore M. Albert, chief of the USGS office of data administration, told *Computerworld* last week. He said that Storage Technology Corp. (STC) and USGS had a verbal agreement that STC's 7600 Optical Storage System would be shipped in October 1983 so that USGS could be a beta test site for the 4G-byte storage system.

Albert said USGS is "extremely interested" in the system because STC's 14-in. disks are the only affordable, high-density optical storage devices now on the market. "We need that kind of technology," he said, particularly for high-volume backup and archival storage.

Asked about the delay, Jack Scott, vice-president of STC's worldwide marketing, said, "We were behind schedule because there were a number of integration and design issues that had to be resolved. They are now being resolved."

Scott said STC is now shipping subsystems to customers for alpha tests and predicted the volume of shipments will increase in the second quarter of 1985.

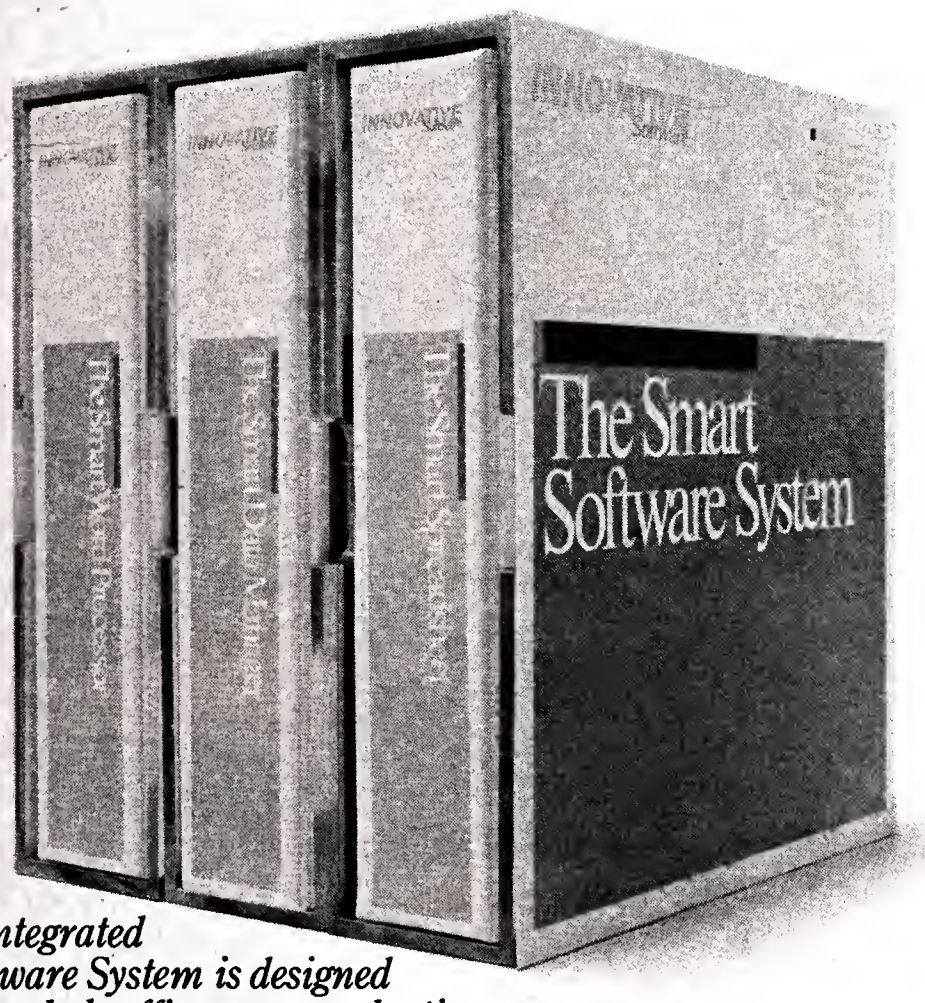
For the USGS, Albert said delivery had been scheduled for September, was delayed to October, then December and now is tentatively scheduled for early spring. "Hell, I've got data sets sitting here. I've got people trained to do it. We still want to test the equipment, and we will do so if [STC] ever ships it," Albert said in a telephone interview from his office in Reston, Va.

"We've been looking at the technology for five years, kicking the tires, and we're pretty sure we want to go with it for our mass storage needs," he said. "The question is, can we get the technology in-house and start using it?"

Albert said the USGS is exploring optical disk technology for digital storage of scientific and engineering data — such as cartographic, geologic, hydrologic and Landsat satellite data — as well as for scientific and administrative records.

In addition, he said, USGS wants a digital image-scanning system for storage of the agency's massive files of maps, charts, graphs and other documents.

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Sound off about your software

Software comes of age. January's Special Report on Application Software Packages will take a look at the continuing use of off-the-shelf software and what this means to management, data processing and end users.

In addition, the Special Report will cover training alternatives for staff members using newly purchased packages, software security concerns and the ramifications of modifying application software.

If you have a late-breaking story concerning application software issues, contact the Special Reports Editor.

February's Special Report focuses on data communications networks. The report will cover new technologies and regulatory trends.

So, if you are lost in a forest of local-area or long-haul networks, February's Special Report can help. The report will update you on network architectures, communications software, independent software and satellite communications.

The Special Report will focus on corporate networking choices including the feasibility of satellite bypass and private-line networks.

Contributions to these Special Reports should take one of two forms: tutorial articles discussing issues or trends or applications stories outlining a particular user firm's experience.

Articles may range from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached. Contact the Special Reports Editor for a deadline for the January Special Report. The submission deadline for the February Special Report is Dec. 28.

Stories you would like to tell or questions you want to ask may be sent to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Cost, cancellations impair software quality

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Up to 25% of large software systems (those with over 64,000 lines of source code) currently under development will be canceled before they are completed, and up to 60% will experience significant cost and schedule overruns, according to T. Capers Jones III.

Jones, general manager of the Nolan Norton Co., painted a pessimistic picture of domestic software quality and programmer productivity at a seminar held recently at the Enterprise Information Systems Forum here. Jones said a recent study found that along with the cancellations and overruns, approximately 75% of the large systems under development will experience serious operational difficulties.

Today, the average large system software project runs more than a year behind schedule and costs almost twice as much as initially estimated, Jones said.

Factors slowing development

Armed with statistics gathered from his study of 200 major U.S.-based corporations, Jones said that several key factors caused the development slowdowns — variations in productivity related to program size, the complexity and originality of the program and changing program development models.

Program enhancements in a large program (250,000 lines of source code) usually require twice as much time and money to develop as first-time, stand-alone programs, Jones said, due to increasingly complex requirements for base code analysis, program recompilation and configuration control.

Jones' study showed that, on the average, it takes 48 to 60 months to develop a very large program (with over 512,000 lines of code), 15 to 36 months to develop a medium-size program (with up to 64,000 lines of code) and five to 15 months to develop a small program (up to 2,000 lines of code). To avoid significant cost and schedule overruns, he said, companies must use realistic development schedules based on these projections.

In very large programs, defects in coding, documentation and incorrect bug fixes result in an average of 300 serious errors per 1,000 lines of code, Jones said. To correct this, the development model is emphasizing longer design times, high-speed prototyping and a shorter debugging phase.

Another problem facing software developers is the rising cost of software maintenance, a cost that has skyrocketed to as much as 80% of the total development budget. IBM maintains over 30,000 application programs, he said, adding, "Maintaining 30,000 programs can get as expensive as maintaining a fleet of 30,000 Cadillacs." According to Jones' figures, a program with 250,000 lines of source code used by 1,000 international users will cost $79,000,000 to maintain over a five-year period.

Recent studies conducted internally by IBM, TRW, Inc. and Nippon Electric Co. of Japan showed that maintaining "error-prone modules" (those portions of programs with clustered errors) is the most expensive single task in the industry, Jones said. If error-prone modules of programs can be isolated and recoded, companies can realize considerable cost savings, Jones claimed, because only specific program areas need to be reworked.

Baseline software quality and productivity can be increased and maintenance costs reduced by as much as 75% by using structured code, program generators and high-level programming languages, Jones said. Another productivity enhancer catching on with U.S. and Japanese corporations is the development of standard libraries containing blueprints of reusable code. Code blueprints can lower development time by 80% and decrease program defects by over 20%.

PTC conference set for January

HONOLULU — Representatives from four Asian and Pacific nations will review the development of telecommunications in their countries at the Pacific Telecommunications Council's (PTC) eighth annual conference Jan. 13-16 at the Sheraton Waikiki here.

Case studies of Korea, Taiwan, New Caledonia and New Zealand will be presented during afternoon sessions of PTC '85. Y. K. Chen, director of telecommunications for the China, will review his country's move toward a digital environment. Registration fee is $395 per person.

More information is available from PTC at Suite 308, 1110 University Ave., Honolulu, Hawaii, 96826.

What we
is a failure to



IBM policies said to push DP centralization

Analyst cites company's software fees as example of bias against distributed processing

By John Desmond
CW Staff

NEW YORK — While IBM appears to have taken a neutral stance on the issue of centralized vs. distributed information networks, the company continues to encourage users to adopt as much centralization as it can, according to consultant, author and lecturer Fred Lamond.

Speaking at a seminar on IBM strategy here recently, the specialist in analysis and evaluation of IBM cited the following IBM strategies that encourage centralization:

- Software license fee policy.
- The IBM Network Communications Control Facility (NCCF) and Operator Communications Control Facility (OCCF) programs.
- Instant data base updating.

IBM "fought for a long time against distributed processing," Lamond said, defining distributed processing as systems in which processing is shared between remote and central CPUs. (In contrast, in dispersed processing the remote CPUs have no communication with the host.) According to Lamond, since 1979 IBM has formally announced a more neutral position concerning centralizing networks.

Users who have multiple 4300 series CPUs as satellites, who may want to run an electronic mail program on each one, run up against IBM's policy on licensing.

IBM software licensing policy

The policy requires that a software license fee be paid for each CPU running a program, regardless of CPU size. A 4361 Model 3 processing 100 transactions per day will pay the same fee as a 3081 Model KX processing 10,000 transactions per day, Lamond said.

"The flat rate per CPU license fee encourages users to run programs on the smallest possible network of CPUs," Lamond said. He added that IBM usually raises its software license fees when it announces hardware price reductions. "The more you distribute program products, the more your software license costs will go up in relation to your hardware. This is an important tool IBM uses to encourage you to centralize," Lamond told his audience of DP professionals.

IBM's NCCF and OCCF programs encourage DP professionals to be physically located at the host site, "so that no systems programmers are required at a distributed site," Lamond said.

When systems programmers themselves become distributed, "mini DP departments" may rise and a loss of control could result, Lamond suggested.

With NCCF, any workstation becomes a control console, and the remote site needs only an operator. The OCCF preserves a system dump of a program stopped by a programming bug on disk at the remote site, instead of printing it out. The dump pages are forwarded one at a time to the host.

Lamond said that in IBM's image of a typical computer network in the mid- and late 1980s, the host mainframe runs MVS, and data is archived to magnetic tape only from the host. "All DP professionals are at the corporate host site, responsible for all data archiving and for upkeep of the corporate data base," Lamond said.

The local satellites are equipped only with disk drives — no tape drives — and the data on disk must be moved upstream to the host for updating.

'IBM pushing a bit too far'

Although Lamond said he likes the system, there is one aspect that he said "IBM is pushing a bit too far."

That aspect is requiring updating of the corporate data base simultaneously with transactions at the remote sites, which is a communications expense as well as a processing demand. "You may have applications where you need that instant, on-line communications, but for most users, the corporate data base as a backup for the local [data base] is a good idea," Lamond said.

"I do not believe the corporate data base always has to be brought up simultaneously." Once or twice a day would be adequate, he added, noting that with such a practice, "You will probably be able to do with a much lighter host."

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Nursery's ordering system cuts wilted sales

By Paul Gillin
CW Staff

SAN DIEGO — Order processing and billing at Santa Ana, Calif.-based Hines Wholesale Nurseries are a little different from most wholesale businesses. If Hines misses a shipment by even a few days, it could mean canceling the whole order or even scrapping the product.

That is because Hines deals in an especially fragile product — ornamental plants. Its 420-acre Santa Ana nursery grows 20 million plants annually, 800 varieties in all. That makes Hines one of the top three producers of container-grown plants in the country. The company also operates nurseries in Houston and Vacaville, Calif.

To process orders in 24 hours or less, Hines uses an IBM System/38 with 4M bytes of main memory and a line of integrated financial software from Professional Computer Resources (PCR) of Oak Brook, Ill. The two sister nurseries, located in Houston and in Bacaville, Calif., and the Hines sales staff are kept on-line to the Santa Ana nursery through four dedicated communications lines, according to Jim Wapelhorst, director of management information systems. Wapelhorst was interviewed at PCR's Fall User Conference, held here recently.

The perishable nature of Hines' products makes on-line processing a necessity, Wapelhorst said. The company's 30 sales representatives use Applied Digital Data Systems, Inc. Viewpoint portable terminals to enter orders from around the country. Sales representatives can also log on to the System/38 to check the status of nearly any order at any time.

When an order is entered into the system, it passes through a credit check and is either put on hold or cleared for shipment. The order pops up on the shipping managers' screens at any combination of the three locations that will fill the requirement. The manager decides in which truckload the order will be shipped and enters that number into the computer.



CW photo by P. Gillin
Wapelhorst

The software then calculates the size, weight and shipping charges of the load and also factors in extra charges like boxing costs. It also assigns a dock number where the plants should be loaded.

Picking labels then come off the printer, detailing the pertinent information for loading. The picking orders are sorted by variety of plant so that tractors can bring back fuller loads and spend less time traversing the fields to pick up bits and pieces of an order, Wapelhorst explained.

A quality assurance (QA) inspector has a last chance to modify the order prior to shipment. "Because we're dealing with perishable products, customers may want only a bud or a bloom on a plant," Wapelhorst said. "QA people can modify the orders and include explanations why a product wasn't shipped. When the shipper is just about to send out a truck, he hits a button and prints out a bill of lading for that shipment."

Hines plans to install PCR's manufacturing software next year, Wapelhorst said. "The whole idea is to know what our costs are and to have the plants in stock the shortest period of time after [they are] ready for sale," he said. "Unlike a lot of operations, when our inventory is on the shelf, we have to water it, prune it and take care of it."

Productivity meet slated

TUCSON, Ariz. — The Sixth Annual Conference on EDP Performance Management, sponsored by Applied Computer Research, Inc., will be held at the Doubletree Inn here March 11-15.

The conference will focus on the productivity of human and machine resources in serving user needs, with primary attention to managerial aspects. Specific topic areas will include the integration of business and data processing planning, capacity management, peformance management, human factors, costing and pricing and communicating with management. A one-day tutorial on "Improving the Data Center Function" will be held Monday, March 11.

Prices for the conference are as follows: for the one-day tutorial held March 11, $100 for either subscribers or nonsubscribers to Applied Computer Research publications; for the entire conference, March 11-15, $500 for subscribers, $575 for nonsubscribers; and for both the tutorial and the conference, $575 for subscribers and $650 for nonsubscribers.

More information is available from Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

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NEWS

Softfair '84 recruiters emphasize experience

Companies seek senior software, scientific engineers, communications managers

By Maura McEnaney
CW Staff

WALTHAM, Mass. — Senior software engineers, communications managers, scientific engineers and program analysts were all in demand at Softfair '84, a job fair held here recently for software professionals.

For the 50 companies exhibiting at the job fair, employment needs ran the gamut, but for those without prior experience, one factor was evident: Entry-level job seekers need not apply.

At the well-attended Digital Equipment Corp. booth, signs calling for telecommunications professionals, software engineers and MIS professionals decorated the exhibit. In the center of the display was a sign reading "no entry-level positions."

"We do our entry-level recruiting on college campuses," said Bill O'Connor, manager of technical support.

At the Foxboro Co.'s booth, staffing specialist Fred DelGizzo said his company, a manufacturer of process management and control systems, had 30 technical positions available. The company was looking for software specialists in AT&T's Unix, C, Pascal, applications software, communications software as well as graphics and diagnostics. The average salary offered for these slots is $30,000 to $40,000, he said.

Range of visitors

Visitors to Softfair ranged from programmers who wanted to switch concentrations to technicians curious about current employment opportunities. Because of the sensitivity involved with job hunting, *Computerworld* agreed to use only the first names of the attendees.

Larry is a project manager with four years of experience at one company. After a career switch, Larry believes he entered his current position "at too low a salary. . . . It's been a good learning experience, but I have to make up for some salary," he said. As a project manager, Larry is looking for $50,000 a year. "I don't know if I'll get it; if I don't, I'll be happy where I am."

Shirley is a Cobol program analyst and a software consultant with three years' experience in Cobol programming. She said she is looking to spend less time in front of a computer terminal dealing with accounting problems. She said she was at the fair exploring opportunities in marketing support or technical writing. But she found her reception somewhat cool. "[The exhibiting companies] are hoping Mr. or Ms. Right will walk through the door knowing everything about Cobol, C, Unix and CICS . . . and be a living doll," she said. Shirley is now making $28,000 a year. "If I can match it and get into a situation I like, that will be even more important to me."

With four years of experience in Cobol programming for business applications, Chris is looking to switch her concentration. "The market is changing, it's going away from mainframes and into micros," she said. "I'm interested in a job where I can keep up with what's happening." Chris now makes $28,000 a year, but said that if she switches jobs, she would be looking for $32,000. But, she said, "Money is not a major consideration."

OIR publishes summary of '82 users meeting

WALTHAM, Mass. — The Organization for Industrial Research (OIR) is making available the summary of the 1982 OIR Users' Meeting, documenting the experiences of users of group technology, classification and coding and computer-assisted process planning.

"The 1982 OIR Users' Meeting Summary" contains case histories documenting the application of OIR's computer-aided design and manufacturing and group technology manufacturing software products.

Articles cover topics such as implementation procedures, benefits, human factors, hardware requirements, time standards, computer-aided process planning and computer graphics.

OIR currently publishes four software packages for the manufacturing industry. They are Multigroup, for group technology analysis; Multicap, a computer-aided process planning package; Multitreeve, a design retrieval system; and Multiclass, a classification and coding package.

The book costs $30.

More information is available from OIR, which is located at 240 Bear Hill Road, Waltham, Mass. 02154.

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NEWS

High-tech firms hire pros, lower costs at job fair

By Maura McEnaney
CW Staff

WALTHAM, Mass. — At a function center adjacent to this state's self-proclaimed "Technology Highway," Route 128, local companies gathered with aspirations of hiring the best and the brightest of the area's software professionals.

Inside, specialists clad in business suits and bearing resumes drifted down aisles of booths boldly displaying company logos and in-house brochures. When they stopped to look, smiling personnel would extend a hand and begin their pitches.

This was Softfair '84, a two-night exhibition of corporations in the market for trained technological help.

Aids market exposure

Job fairs like this one are becoming increasingly popular, both among corporations looking to reduce hiring costs and professionals seeking exposure in the job market, according to David Callahan, manager of Software Career Link, sponsor of Softfair.

That popularity is evident in the number and names of participants. This year, Software Career Link sponsored seven job fairs in the Boston area. Next year, the company is taking its show on the road, planning 42 fairs for 13 cities, including Atlanta, Chicago, Dallas and Anaheim, Calif.

More than 1,000 attendees

At this month's fair, more than 50 companies paid about $2,700 a piece for booths at Softfair, which was attended by about 1,050 professionals. This year's roster included some heavy high-tech hitters, such as Adage, Inc., Cincom Systems, Inc., Cullinet Software, Inc., Digital Equipment Corp., Hewlett-Packard Co. and McCormack & Dodge Corp. For many firms, it was a new experience.

Softfair and other similar job fairs are "a godsend" according to Frank Emro, senior technical recruiter at Cullinet. The average cost of hiring a professional can range between $4,000 and $10,000 or more if an employment agency is used, Emro said. "If you take out a full-page ad in the *Boston Globe*, that cost can be $18,000 to $20,000, and you spend a week going through resumes." According to Emro, "Job fairs are a very inexpensive way to talk to a large number of very qualified candidates."

Reduces hiring costs

Hiring is almost continuous at Cullinet, which nearly doubled its work force over the past 16 months, Emro said. In addition, the company expects to hire another 700 workers over the next year and a half, he said. The company hires an average of between seven to 10 people as a result of each fair, which significantly reduces the cost per newly hired employee to about $100 per person, according to Emro.

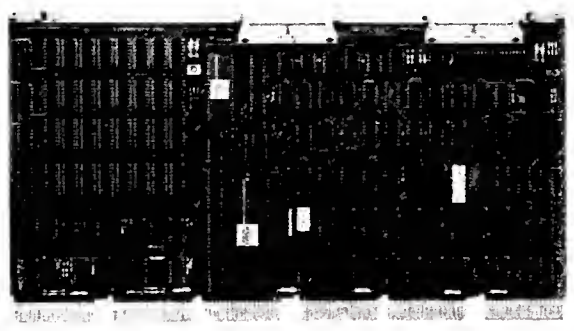
For DEC, job fairs give department managers the opportunity to meet applicants face to face and immediately begin assessing the needs of the prospective employees, according to David Bausch, personnel recruiter at the DEC office in Merrimac, N.H. "If you can hire one person from the show, it's worth it," he said.

Although she is not convinced that it is the only way to hire qualified candidates, Robin Schwartz, group personnel manager at McCormack & Dodge, agrees with her colleagues. This year, the software company participated in about 10 job fairs, including five Softfairs, Schwartz said.

At each fair, the company expected to hire three or four candidates (about the average, according to Softfair's Callahan), bringing down the cost of hiring to about $500 per person, she said.

In addition to computer-related companies, general industry is beginning to be a big participant in the Softfairs, Callahan said. This year, Stop and Shop supermarkets, John Hancock Insurance Co. and retail store chain Zayre Corp. were among exhibitors. "Because these firms employ sophisticated computer systems, they are joining the high-tech crowd," he said.

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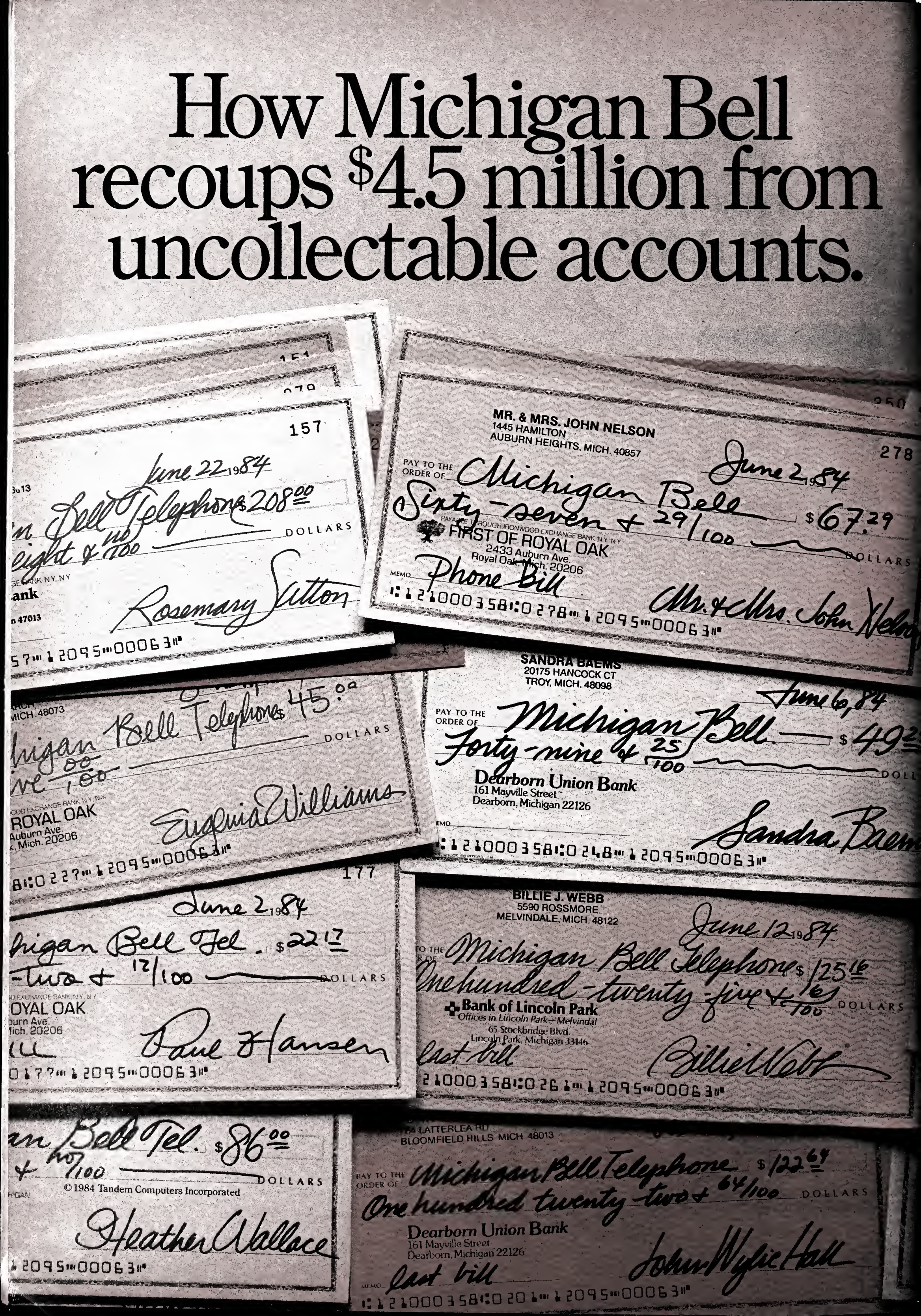
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SANDY METZ
551 COMMONWEALTH AVE.
BLOOMFIELD HILLS, MICH. 48013
PAY TO THE ORDER OF Michigan Bell Tel
Eighty-eight 25/100 —
Dearborn Union Bank
161 Mayville Street
Dearborn, Michigan 22126
MEMO
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300
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One hundred-eighty three
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SOUTHFIELD BANK
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Southfield, Michigan 47075
⑆210003581⑆0125 ⑈ 1209500063⑈

BARRY ARIKO
139 WESTHILL DR.
HUNTINGTON WOODS, MICH. 48070
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PAY TO THE ORDER OF Michigan Bell Tel. $82.10
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Southfield, Michigan 47075
Barry Ariko
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Royal Oak, Mich. 20206
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Strategic planning vital to computer security

By John Gallant
CW Staff

ROSEMONT, Ill. — Q. How do you eat an elephant?

A. One bite at a time.

According to Martin Silverman, a partner in the Management Consulting Services Division of the accounting firm of Coopers & Lybrand, that riddle holds in it the key to successfully securing an organization's computer systems. Silverman, who spoke last week at the 11th Annual Computer Security Conference here, told attendees that quick fixes and easy solutions to security were not the answer. Security must be approached one bite — or step — at a time. And planning, especially strategic planning, should be relied upon as a guide.

"[GTE Telenet Communications Corp.] and other public networks have been unfairly accused of providing illegal access to supposedly secure systems," Silverman said. "But we cannot assign blame to Telenet and the others. Like Shakespeare said, the fault lies with ourselves. Examples of lousy security and poor planning abound. Strategic planning is the missing link in security today."

One characteristic of such poor planning, Silverman said, is that security has historically been considered a burden for users; security is often traded for so-called user friendliness. He said security has been a nonconcern for management, who either did not understand or care about its importance. In addition, security has been handled as merely a procedural issue for DP auditors who performed some perfunctory security checking, and it has been little more than an after-thought for DP.

Those factors have led to security mechanisms that are superimposed on applications once the system is already designed, developed and implemented and that are limited by convenience because designers fear users simply will not put up with strict security. Once in place, Silverman said, those mechanisms are thwarted by practice and a basic lack of understanding.

What's more, Silverman said, the security problem is worsening. Minicomputers and microcomputers, in addition to mainframe-connected terminals, are proliferating, and user sensitivity to security concerns is dropping as desktop capabilities increase.

"Despite the publicity surrounding the hackers," Silverman said, "we are not gaining any ground, whatever their motives. The rats are getting smarter while the trap makers fall behind, and the owners cannot be bothered."

"At the same time," he continued, "we are being told that the effective utilization of corporate data through efficient information systems will improve profitability and provide a competitive advantage. We are told that data is a major asset that can give you an edge. We are not being told that inappropriate security can destroy such an edge, and that is the clearer reality."

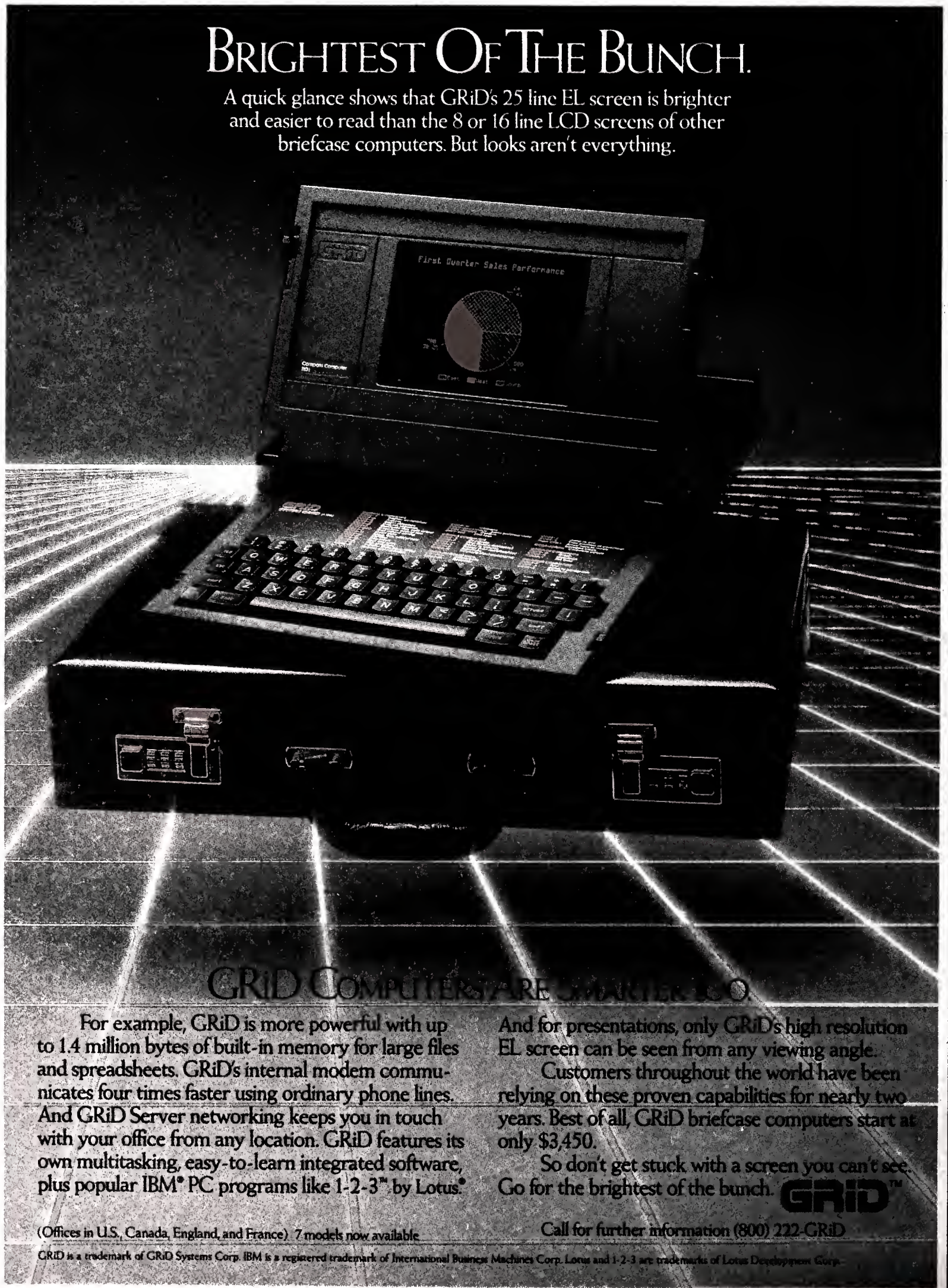
Silverman described a Coopers & Lybrand study based on interviews with top-level managers in major U.S. corporations. According to the findings of that study, more than 50% of the senior managers queried said they believe their businesses and industries are mature or declining. Thus, marketing and increased productivity are seen as more important than new strategic directions.

The findings, according to Silverman, indicate that accurate data and its protection are vital to American business today.

"Information integrity, communication, manipulation and analysis outside the traditional DP shop are critical success factors in modern American business. Security is a key element in ensuring the first three, and the fourth is impossible without security. We simply must convince senior management that security is vital to the mission of business today," he said.

In order to do that, Silverman said, security coordinators must "shed their mechanic's overalls" and take a seat at the corporate planning table. Security personnel must act as catalysts, bringing functional groups within the organization together to work out security guidelines and projects. Organizations must adopt a new approach to MIS development — an approach in which security becomes a basic component of system design from the beginning. In addition, senior management must become more involved in security planning and must understand the vital nature of information integrity.

Silverman suggested that security coordinators begin by constructively stating the case for a strategic approach to security. That includes stating the facts about security without relying on "fear tactics" and outlining reasonable costs and goals. Security personnel should also include in the management presentation a first project plan — what he described as the first bite of the elephant. Finally, he urged coordinators to document objectives to provide landmarks against which future progress can be measured.



NEWS

Standards key to small-scale systems security

By John Gallant
CW Staff

ROSEMONT, Ill. — Ironically, acquiring a small-scale computer system can make an end user acutely aware, often for the first time, of the security problems mainstream DP faces.

In a typical scenario, according to Evany Miller, an end user reads in a trade or business publication, such as *Computerworld*, about a revolutionary small-scale system recently made available that promises to solve a plethora of nagging problems.

Miller, a senior data security analyst with Rainier Bancorporation who spoke at last week's 11th Annual Computer Security Conference here, said the system offers the user an end to reliance on mainstream DP and spurs visions of increased productivity and capabilities. Thus, the small-scale system is brought in-house, and the user is off and running — sort of.

"But no one told the manager that there were some direct correlations between mainframe and microcomputer security," Miller said. "For example, the user has to pick a good password, and he or she has to see that there is no sharing of passwords among the users of the small-scale system. The manager is also faced with building in accountability, maybe even audit trails, to ensure data integrity. The user has to provide for physical device security and for the backup of data on diskettes, both on- and off-site.

"These were all DP responsibilities before," Miller continued. "Suddenly, they are all the managers' responsibilities."

Security coordinator's job

To prevent security chaos among the many users of small-scale systems within an organization, Miller said, it is imperative that security coordinators draft, maintain and communicate to end users specific, carefully established corporatewide policies, standards and guidelines. She said they should encompass everything, including the selection of hardware and software, the acquisition process, security responsibilities, information classification and physical security of small-scale systems. Miller defined small-scale systems as intelligent processing devices such as minicomputers, micros and office automation equipment.

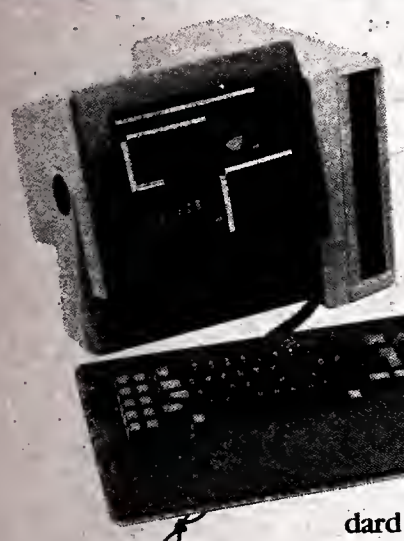
"It is your responsibility as security professionals," Miller told the audience, "to provide insight to users on the protection, integrity and security of small-scale systems. They can be invaluable as tools for specific needs, but without orchestrated management, they can result in frustration and confusion."

According to Miller, such policies, standards and guidelines are essential to a proactive, rather than a reactive, approach to computer security. "Small-scale systems are with us to stay," she said. "But the random purchase and use of such systems may be setting your organization up for disaster. Good policies and procedures can make these tools the valuable assets they were intended to be."

Miller said policies and guidelines for selecting hardware and software offer such benefits as providing for compatibility of devices, potential price discounts for volume buying and improved positioning for working out maintenance agreements with vendors. Policies for acquisition can encompass guidelines for risk and cost/benefit analysis, provide control over requisition, approval and installation and encourage a complete inventory of all computing resources.

"Policies presuppose a corporate architecture for the future use of automation," Miller said. "They can serve as a means of communicating to people what their roles are in protecting company information."

As an example of a formalized set of policies, standards and guidelines, Miller exhibited Rainier Bancorporation's systems integrity policies. Rainier's documents include a description of the legal basis for computing security and controls, a statement of the company's data security policy, an in-depth summary of security responsibilities and information on data classification schemes and standards for the control of information and computing resources. Also included in Rainier's policies are standards for the physical security of systems.



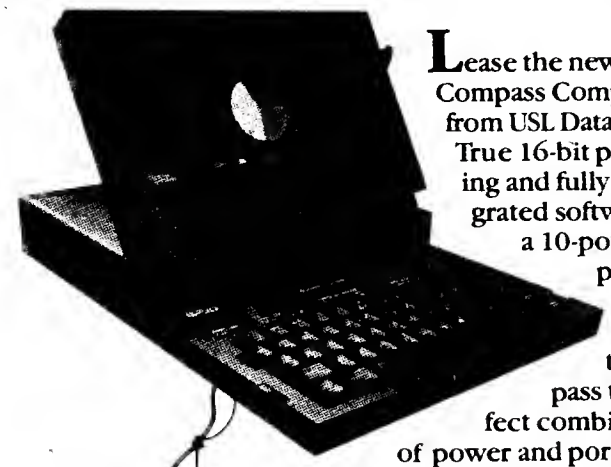
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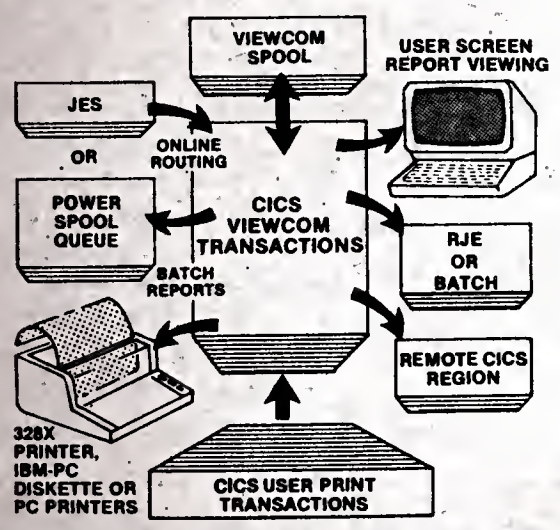
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Micro software TV ads play to mixed reviews

By Edward Warner
CW Staff

When Lotus Development Corp. ran a series of television commercials for its then-new Symphony integrated software during the 1984 Summer Olympics, the dealers were not the only ones beseiged by Symphony-hungry customers.

Ron Goldfarb's phone rang off the hook.

Goldfarb, manager of office automation systems for Pratt & Whitney Aircraft Group in Hartford, Conn., said he received dozens of calls after the series of ads aired, most of them from his firm's users of Lotus' 1-2-3 software.

Independent microcomputer support manager Karl May, meanwhile, said he found the magazine ads and television commercials from Apple Computer, Inc. sparked interest among the corporate users to which his firm, Complete Technology Corp., located in Elmhurst, Ill., provides micro support, peripherals and software.

Every available inch of advertising space, reportedly worth $3 million, in the November election issue of *Newsweek* magazine was devoted to Apple products.

Little or no impact

Other micro managers, however, have found the ads have had little or no impact on their users, and some, noticing greater brand awareness among users, attribute it not to advertising but to a continuing rise in user sophistication.

Surprisingly perhaps, several retailers also gave mixed reviews — at least on selling power — to the 1984 ad campaigns of firms such as Lotus, Ashton-Tate and Apple. The campaigns, which made heavy use of television, may have promoted name recognition for the firms but did little to improve product sales at the corporate level, said Tony Morris, whose New York-based Morris Decision Systems, Inc. sells micro hardware and software to corporate customers only.

Morris said he was in a "peeved mode, rather than an [enthusiastic] mode" because of the lack of success of any of the campaigns. Madison Avenue, he charged, has "hosed down" the personal computer industry, and "many of those moneys [spent on advertising] have been wasted."

Ralph Wagner, owner of Microsource Financial of Watertown, Mass., which retails hardware and software primarily to corporate accounts, said he, too, was not entirely pleased. The Apple ads, he said, were a success, but those for Symphony from Lotus "missed the mark not by a mile but by a light-year." Their biggest shortcoming, he claimed, was that they "did nothing for store traffic" and made no tie-in with Lotus dealers.

Uncertain of any impact

Many micro managers said they were uncertain that the ad blitz was having any impact on their users. While acknowledging that "I don't think you can watch an hour or so of prime-time television and not see commercials for hardware or software," said Gene Maiman, project manager for microcomputers at Columbia Pictures, Inc.'s New York office. "It's really hard to trace the original source of where the user got that product idea."

More and more users are coming to him asking for products by their brand names, but, Maiman said, this could be because users have become more sophisticated, an idea supported by Ron Jenks, director of information services at Touche Ross & Co., a New York accounting firm. Jenks said his firm's users were already knowledgeable about microcomputer hardware and software because micros have been in use there for between four and five years, and a personal computing newsletter has been circulating among the users for the past three years.

What may be the bigger concern for microcomputer managers, Pratt & Whitney's Goldfarb pointed out, is the question of what to tell the users when they ask for a product by name, only to find that it is not supported by the firm. This, he said, was exactly what happened when his phone was ringing off the hook with users who wanted Lotus' Symphony. Symphony, he said, had already been tested by his office and found to be too difficult to use. But what to say to the users who wanted to move up?

Goldfarb said he told them: "Trust me, guys, what you're using now is better."

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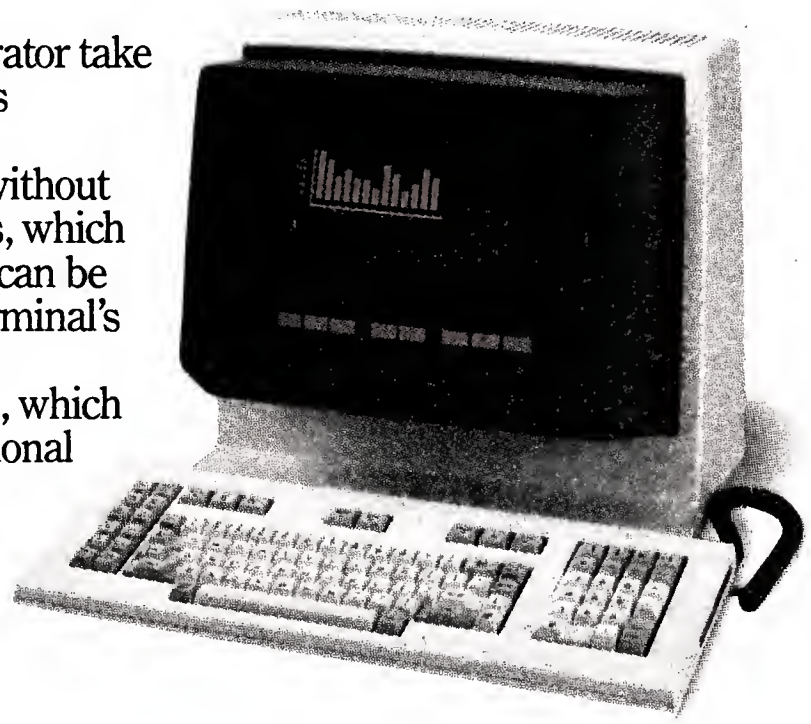
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With 38 downloadable function keys and 16 screen labels, the 5425, which is also VT102* compatible, opens new levels for productivity. And the optional integrated intelligent modem features five programmable autodial keys to speed the dialing and logon functions. The modem also permits remote transmission from a standard phone jack.

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OA not justified solely on investment return

Cost reductions that accrue, improved decision-making methods should interest execs

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — Justifying office automation by an economic return on the investment alone is myopic, said Tom K. Lewis, the White House director of automated systems. In fact, the intangible benefits of automating an office are almost impossible to measure before a system is installed.

"Return on Investment is probably one of the least significant aspects when you are considering OA," added Lewis, who successfully introduced OA to the White House in 18 short months, where now 10 top assistants to the President are devoted terminal users.

Lewis, along with Jeffrey Borrer, vice-president and manager of decision support at First Boston Corp. addressed a session at the recent Federal Office Automation Conference, and both agreed on the difficulty of accurately assessing what kind of economic return there will be on OA hardware, putting micros on managers desks and establishing communications links to mainframe data bases.

However, when a strategic planner is hard-pressed to justify to top management exactly what benefits will result from spending resources to automate, the two MIS strategists suggested similar approaches.

First is the probability that there will be cost reductions that accrue from automation. Automating can cut labor costs, reduce time expenditures, average equipment costs and ultimately save financial resources that would otherwise have been spent. Second, improving the methods of decision making through automation can also be another unquantifiable factor that will justify an investment in OA.

According to Lewis, the vast majority of benefits derived from OA cannot be quantified, since they vary according to each environment. However, "the benefits are more likely at the lower end of an organization than at the top or more strategic level," Lewis said.

In the long run, Lewis said, selling OA solely on its return on investment will not justify its costs. Rather, it is better to sell it as a strategic asset. "What will happen if I don't automate," is a good question to pose to financial management, he said.

Jeffrey Borror, First Boston's manager of decision support, recommended an approach to selling OA that is different from one that most managers working in the U.S. government could be expected to follow — akin to a guerilla approach.

"Go after the senior top executives first. Preferably the younger ones. Don't push, but pick a key target, someone who is interested in the technology for starters. Have some specific applications and solutions that the OA will address. Then you get credibility," Borror suggested.

Finally, Borror recommended that you supply an integrated OA system initially that pulls together the software, micros and mainframes.

Seromda '85 meet set for Nashville

NASHVILLE — The Southeastern Regional Office Machine Dealers Association, Inc. (Seromda) is holding its 1985 convention, Seromda '85, at the Opryland Hotel here using the theme "Keepin' the Tune" from Jan. 31 to Feb. 2.

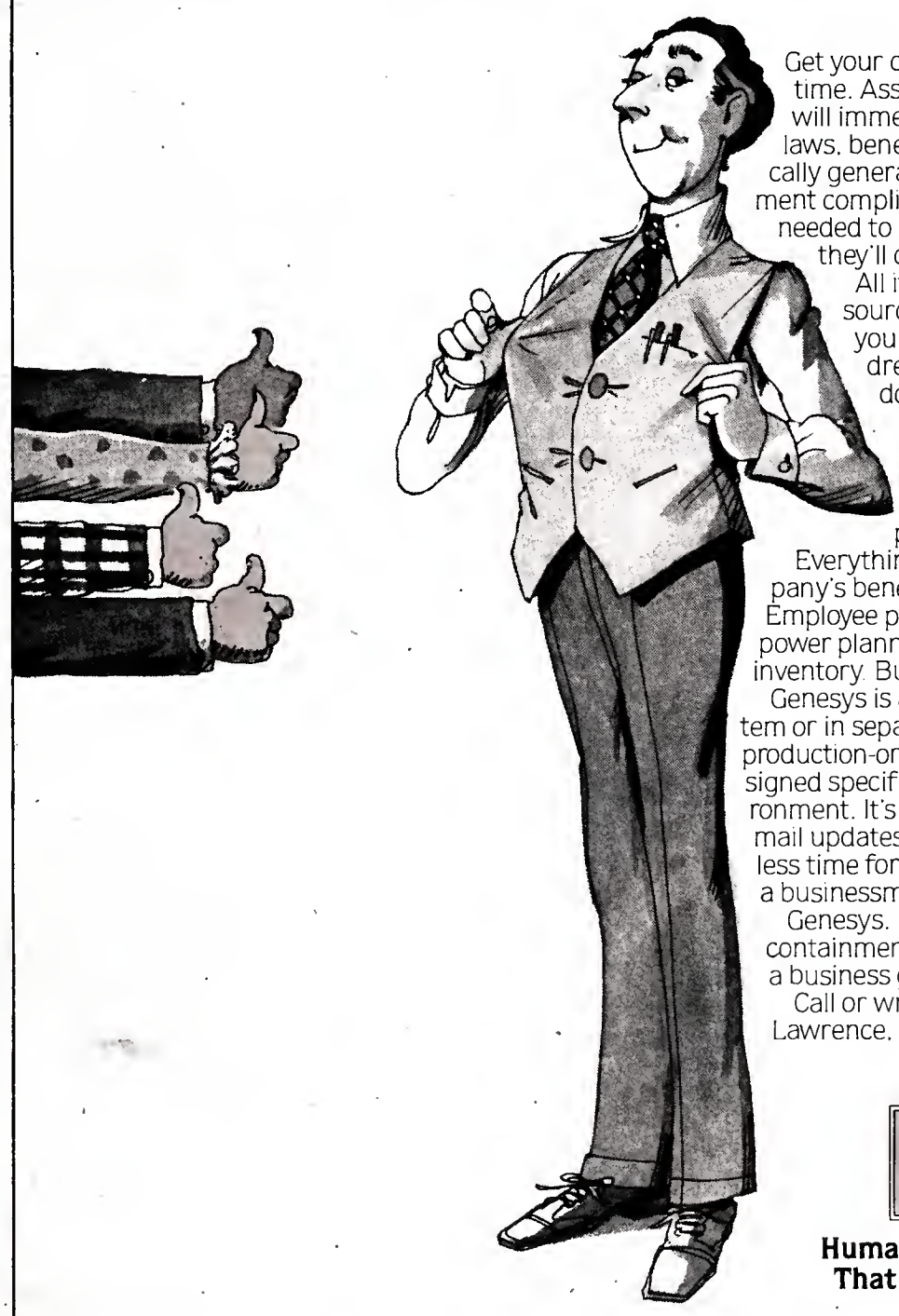
Aimed at dealers and manufacturers, the convention will feature exhibits and seminars. The keynote speaker will be Tom Hopkins, author of *How to Master the Art of Selling*, who will address the concerns facing office sales representatives every day and techniques and strategies for meeting the concerns.

Other speakers include Richard Flint, who will address management philosophies, understanding and implementation and ideas on how best to work with employees; attorney Robert C. Goldberg, an authority on trade regulation who is affiliated with Schoenberg, Fisher & Newman, Ltd. of Chicago, who will address contracts, warranties, dealer litigation and employee relations; and Don Chilton, president and founder of Sales Developers of Smyrna, Ga., who will address how to establish a sales program for office machine dealers.

Advance registration is $100 for members and $150 for nonmembers. After Jan. 10, registration is $125 for members and $175 for nonmembers.

More information is available from Seromda, Suite 205, 5115 Maryland Way, Brentwood, Tenn. 37027.

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Valid AI definition lost amid industry jargon

CW AT RPI AI MEET

FRAMINGHAM, Mass. — Artificial intelligence (*n*): the capability of a machine to imitate intelligent human behavior.

The above explanation, at least according to *Webster's Ninth New Collegiate Dictionary*, constitutes the strict definition of artificial intelligence. But as with any evolving and, unfortunately, overused high-technology buzzword, the term "AI" currently sports a widening variety of confusing and sometimes contradictory definitions.

"If you ask a number of people involved with AI for a definition of exactly what it is, you will probably get n-plus-one answers," Henry Eric Firdman explained recently to a gathering of computer industry and business executives. "There exists a lot of controversy and confusion about artificial intelligence today.

Firdman navigated the executives through a seminar here, sponsored by Rensselaer Polytechnic Institute, titled "Artificial Intelligence and Expert Systems: An Executive Briefing." Firdman is the president of Henry Firdman & Associates, an AI contracting and consulting firm.

What, then, does the term "artificial intelligence" really mean?

"I define an AI system as one that can do three things," Firdman said. "An AI system can acquire new knowledge by communicating to the external world and by inferring from its current knowledge. That communication could be facilitated through sensors, input devices or even another AI system.

"Second, an AI system can carry out goal-directed behavior if it is given a set of goals, strategies for achieving those goals and some adequate knowledge. Finally, it exhibits skill acquisition, meaning that it can improve its performance in certain problem domains based on its knowledge and previous goal-directed behavior experiences."

Firdman said current research undertaken in academia and industry has produced AI systems that exhibit partial capabilities in only one of those critical areas. But to date, he said, no system exists that can boast success in all three realms.

"If a system is truly an AI system," Firdman said, "it will be significantly different six months after you buy it. Thus, any AI product must, by its very nature, be sold as an unfinished product, so to speak."

To aid his listeners in understanding artificial intelligence, Firdman unraveled some of what he labeled the popular but incorrect definitions of AI. For example, he said, many researchers describe AI as the development of computer systems capable of mimicking human reasoning and perception.

"What is wrong with that definition," Firdman said, "is that we do not know much about the mechanisms of human reasoning and perception. In that light, AI is being explained through the unknown."

Others characterize AI as the processing of symbolic information such as concepts, knowledge and relations. "That definition lacks functionality," Firdman claimed. "It is also weak and overly broad. For example, word processing would fall into that definition because it is symbolic information processing. Also, concepts and relations are just particular cases of knowledge, and knowledge processing is by no means all that AI includes."

A third camp, Firdman explained, defines AI as the branch of computer science concerned with designing systems that exhibit the characteristics associated with intelligence in human behavior, such as understanding language, learning, reasoning and solving problems.

"What exactly does that mean?" Firdman queried. "Is solving partial differential equations an intellectual activity? Is human vision an intellectual one? What about driving a car?"

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AIM elects top officers, sets board of directors

MONTEREY, Calif. — A. Paul Cox Jr., president and chief executive officer of Data Systems Corp. of Richmond, Va., was recently elected president of the Association of Information Managers (AIM) for 1984-85 at a meeting at the Hyatt Regency here.

Harvey Wilson, senior vice-president of Honolulu Federal Savings Bank in Honolulu, was elected vice-president of AIM.

Other AIM members newly elected to the board of directors include: Hosie Maxwell, president of Comac of Oklahoma City; Lawrence B. Morse, president and chief executive officer of Northeast Datacom, Inc. of Wallingford, Conn.; David M. Tallcott, president of Mutual Thrift Service Center, Inc. of Albany, N.Y.; and Clyde Tew, senior vice-president of Frontier Federal Savings in Ponca City, Okla.

One-year term

The president and vice-president are elected for one-year terms, and board members serve three-year terms.

AIM, an affiliate of the Financial Managers Society, Inc., is a professional society for people responsible for automation in federal institutions or financial institution service bureaus.

Additional information on the organization is available from Dick Yingst, Financial Managers Society, Inc., Communications Dept., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

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Speaker: Develop strategic plan for adopting AI

CW AT RPI AI MEET

FRAMINGHAM, Mass. — Dr. Henry Eric Firdman likes to tell the story of the Soviet researcher who approached the Ministry of Research and Development seeking funding for his pet project.

After explaining the nature of his undertaking, the researcher was asked, "Has the U.S. done any research in this area?" After the scientist expressed his excitement over the fact that he alone was working on such a project, the minister of R&D flatly replied: "No funding. We will not appropriate any money if the U.S. is not interested in this technology."

The anecdote is more than just an insight into what Firdman described as the workings of the Soviet system. Too often, he told attendees at a recent seminar here titled "Artificial Intelligence and Expert Systems: An Executive Briefing," sponsored by Rensselaer Polytechnic Institute, that U.S. corporations take a similar approach to new technology: If the competition is not looking into it, why should we?

Firdman, president of the AI contracting and consulting firm Henry Firdman & Associates, said management would be unwise to adopt such an outlook toward the fledgling technology of AI. He told his audience that AI can help a firm solve its strategic problems through innovative solutions that can also provide leverage over competitors. But to make use of AI technology, management must first draw up a strategic plan.

Components of plan

What are the components of such a plan? "Define your strategic goals first, then determine how AI technology can help you achieve them," Firdman instructed. "Separate your long- and short-term goals, because AI will affect them differently. Do not get involved in the so-called 'most promising' areas of AI, unless you have a strong scientific or technological backlog and the proper resources to address such a backlog."

Firdman advised management to organize a special in-house task force, possibly assisted by an outside consultant, composed of people with a broad knowledge of AI and an understanding of the human factors, such as fear of job loss, that are involved in the adoption of AI technology. The task force should review the company's operations for major problems, or bottlenecks, that an AI application could solve. The team should then choose one or two of the bottlenecks as "test beds" and outline the resources needed to undertake the AI application and the expected results of the test project.

"Figure out the return on investment you expect from any test bed project chosen, then decide whether it is worth undertaking," he said. "If the answer is 'no,' you have at least acquired new, objective knowledge about your organization obtained from a specific viewpoint. If the answer is 'yes,' you will have avoided the situation of hiring people [AI consultants or researchers] needlessly."

Firdman said that his research into corporations that have undertaken internal AI projects has pointed out three major lessons other companies would do well to learn. First, AI must have what he called "internal champions" among top management or plans and projects may wither on the vine. In addition, Firdman said that the selection of the first AI application is crucial to the success of a firm's entire foray into that new technology.

"The answer to the criticism that AI people do simple things with very complex tools," he said, "is that they want to survive to do more complex things in the future."

Finally, the AI decision-making process must be adapted to the company's corporate culture.

The following are some of Firdman's other tips for making an internal AI venture successful:

- If your task force cannot explain to you in plain English what you should be doing and with what end in mind, it is not worth doing.
- You must know exactly what you want to do before you hire an AI project manager.
- Use external consultants not only as members of the task force but as external auditors during regular project reviews.
- Do not be hesitant about closing down a project if it is not advancing in the right direction.
- When a prototype AI system is developed, use expert judges to assess its performance, and test the prototype in the field as extensively as possible.

"I have no doubt that in the long term an investment in AI is a good thing," Firdman said. "AI is like the research undertaken into nuclear physics in the 1940s. No one understood the importance of what all those scientists were working on in the desert. Then one day they saw the mushroom cloud, and they all understood."

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N.Y.-area banks to tie ATMs into single net

By James Connolly
CW Staff

NEW YORK — Eight New York-area banks plan to link their 750 automated teller machines (ATM) into a single network that would let their customers withdraw cash from any of the banks' teller machines.

The network, which the banks hope to expand throughout the Northeast and into Florida, is being tested now and will be operating by the end of 1984, pending approval by the Federal Reserve Board.

The operating group, the New York Switch Corp., plans to offer the services provided by national shared networks on a metropolitan basis. A spokesman for the company said 30 more financial institutions have expressed interest in the network.

The eight founders include the Bank of New York; Barclays Bank of New York, N.A.; Chemical Bank in New York; Manufacturers Hanover Trust Co. in New York; National Westminster Bank, U.S.A. in New York; Goldome Bank and Marine Midland Bank, N.A. of Buffalo, N.Y.; and Union Trust Co. in Connecticut.

"The idea appeals mainly to commuters — people who may live in [Westchester county in New York] and commute to [New York City]. They will have the benefit of using Bank of New York machines in Westchester and the benefit of Chemical Bank or Manufacturers Hanover in the city where they work," said Alan Pohlman, a spokesman for New York Switch.

Leonard E. Malkin, chairman of the steering committee for New York Switch, estimated that the participating banks have 2½ million proprietary ATM access cards and more than two million ATM-qualified Mastercards and Visa cards outstanding.

Pohlman said the links among the banks will be through a Timeplex Corp. multiplexer marketed by AT&T Information Systems and installed in New York Switch's Fort Lee, N.J., headquarters. Each bank's ATM processors will have dedicated 2,400 bit/sec lines to that multiplexer, which will be connected by 9,600 bit/sec dedicated lines to a switch in New Berlin, Wis. That switch, consisting of Tandem Computers, Inc. Nonstop II and TXPs, is operated by A.O. Smith Data Systems, which developed the software for the switch.

When a customer begins an ATM transaction, the ATM's host processor will detect whether the customer's access card is from that bank or another participating bank. If it is another bank's card, the transaction will be routed to Fort Lee and on to Wisconsin, where the Tandem will identify the appropriate bank and, again through Fort Lee, query that bank as to the account status.

The customer's own bank can approve the withdrawal and record it in the same transaction. The approval is relayed back through the Tandem, and the cash is dispensed. Pohlman said the entire process should take about five seconds longer than with the previous systems, where customers could withdraw cash only at their own banks.

The system will not allow customers to make deposits or payments at banks other than their own.

System check ends search for terrorists

By Donna Raimondi
CW Staff

A gang of alleged terrorists — subjects of an intense nationwide manhunt for years — were flushed from their hideouts earlier this month after police officers did a simple computer cross-match that revealed the group's location.

Federal agents in Ohio arrested five fugitives with a long history of political terrorism, bank robbery and murder after a license check by Massachusetts State Police turned up an alias used by Patricia Gros — wife of alleged terrorist Raymond Luc Levasseur — who was wanted for questioning in the brutal Dec. 1981 murder of a New Jersey State Trooper.

Massachusetts State Trooper Richard J. Barrett said police came up with an alias that was eight or nine years old by following leads. An exneighbor of Gros' in Connecticut remembered that seven years ago Gros was in an accident when she lived in that state, and a check of Connecticut license files showed the same name and date of birth information as one of Gros' known aliases, he said.

Massachusetts State Police Cpl. Frederick J. Roberts said the information was entered into the Massachusetts Law Enforcement Agency Processing System, which runs on a Burroughs Corp. B7900 mainframe with approximately 300 of the state's towns linked via terminals. The alias information was then run through the computerized records of several states, turning up again in New York and finally in Ohio, Barrett said.

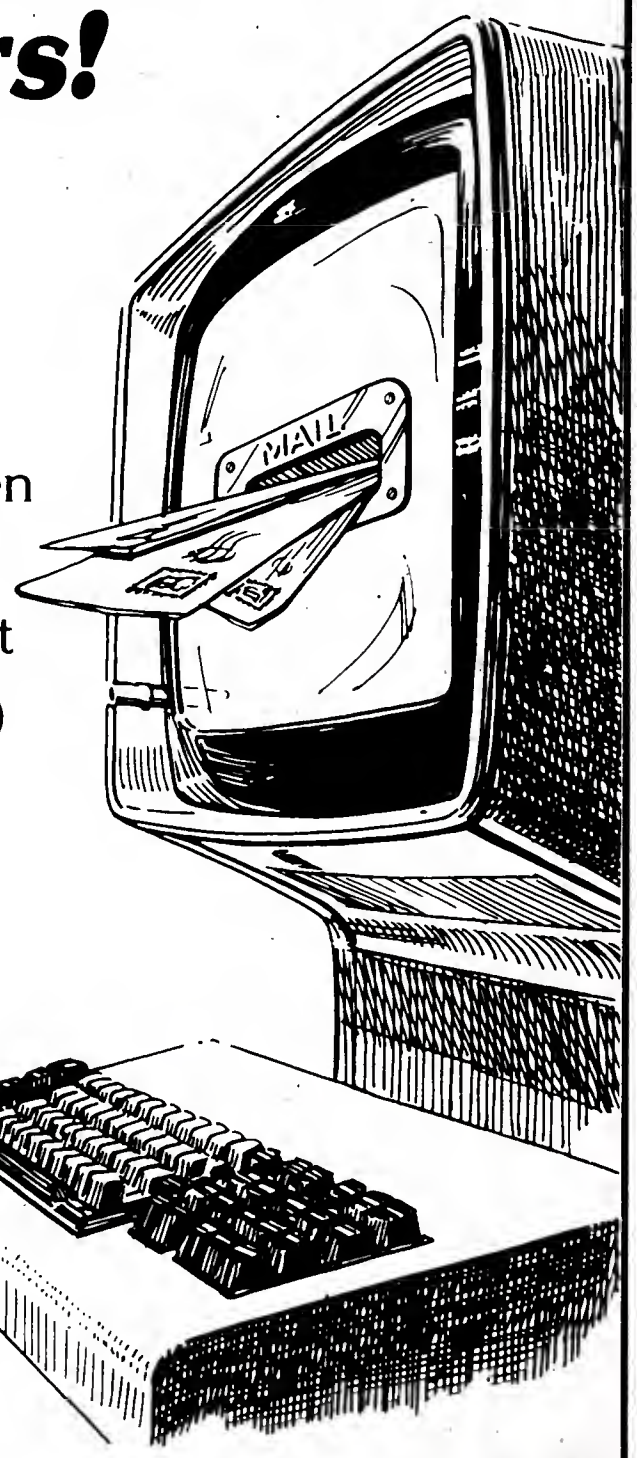
Gros' alias had been lifted from the records of a baby who died in Lowell, Mass., around the time of Gros' own birth, Barrett said. Even though Gros changed her name many times since becoming a fugitive, she kept the license alias the same throughout her stay in Connecticut, New York and Ohio, where she and her gang were picked up.

Lt. Joseph Kobus of the New Jersey State Police said that, following the murder of trooper Philip Lamonaco in 1981, more than 250 troopers searched for members of the gang. Task forces from the New England states and New York had been searching for members of the gang since 1977.

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System integration vital to role of MIS exec

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Without more sophisticated systems integration between mainframes, microcomputers and minis, the MIS director's task of "having the right information in the right place at the right time is an impossible job." The multivendor environments that exist in Fortune 1,000 companies today make integration both inevitable and necessary during the 1990s, Robert T. Fertig, president of Enterprise Information Systems, Inc., of Greenwich, Conn., said in his keynote address at the sixth annual Enterprise Information Systems Forum held in San Diego this month.

Electronic mail applications are limited by the lack of graphics support and by the technical naivete of companies becoming involved in the technology.

Two key benefits to integrated systems, he said, are the ability to share critical resources and information and the elimination of unnecessary barriers to the free flow of information.

Future operating systems will be the most suitable place for integration to occur, Fertig said, and next-generation operating systems should provide facilities for integrating data bases, data communications devices and graphics. Of the many stand-alone operating systems, integrators and operating system extensions that exist in the marketplace today, (including Apple Computer Corp.'s Lisa, Visicorp's Visi On and IBM's Topview), the Windows operating environment from Microsoft Corp. has emerged as the de facto standard for intramachine integration, Fertig said. Windows has been adopted by IBM, Digital Equipment Corp., Xerox Corp., Apollo Computer Corp., Digital Research, Inc. and other manufacturers, largely because it permits data to be viewed concurrently, he said.

During the remainder of the 1980s, there will be a proliferation of more sophisticated micro-to-mainframe links, Fertig said. These links will lower systems costs, provide higher productivity through faster response times, allow greater integrity of messages and superior security, decrease telephone and host connect times, coordinate CPU access with periods of low host utilization and enable the host to support increasing numbers of remote sites.

Presently, there are four viable software technologies for micro-to-mainframe links, Fertig said. These are terminal emulation, file transfer, electronic mail and distributed data processing. According to Fertig, electronic mail applications are still limited by the lack of adequate graphics support and because of the diversity and technical naivete of companies becoming involved in the technology — from small independents and public utility companies to conglomerates like MCI Communications Corp., Western Union, Inc. and GTE Telenet Communications Corp.

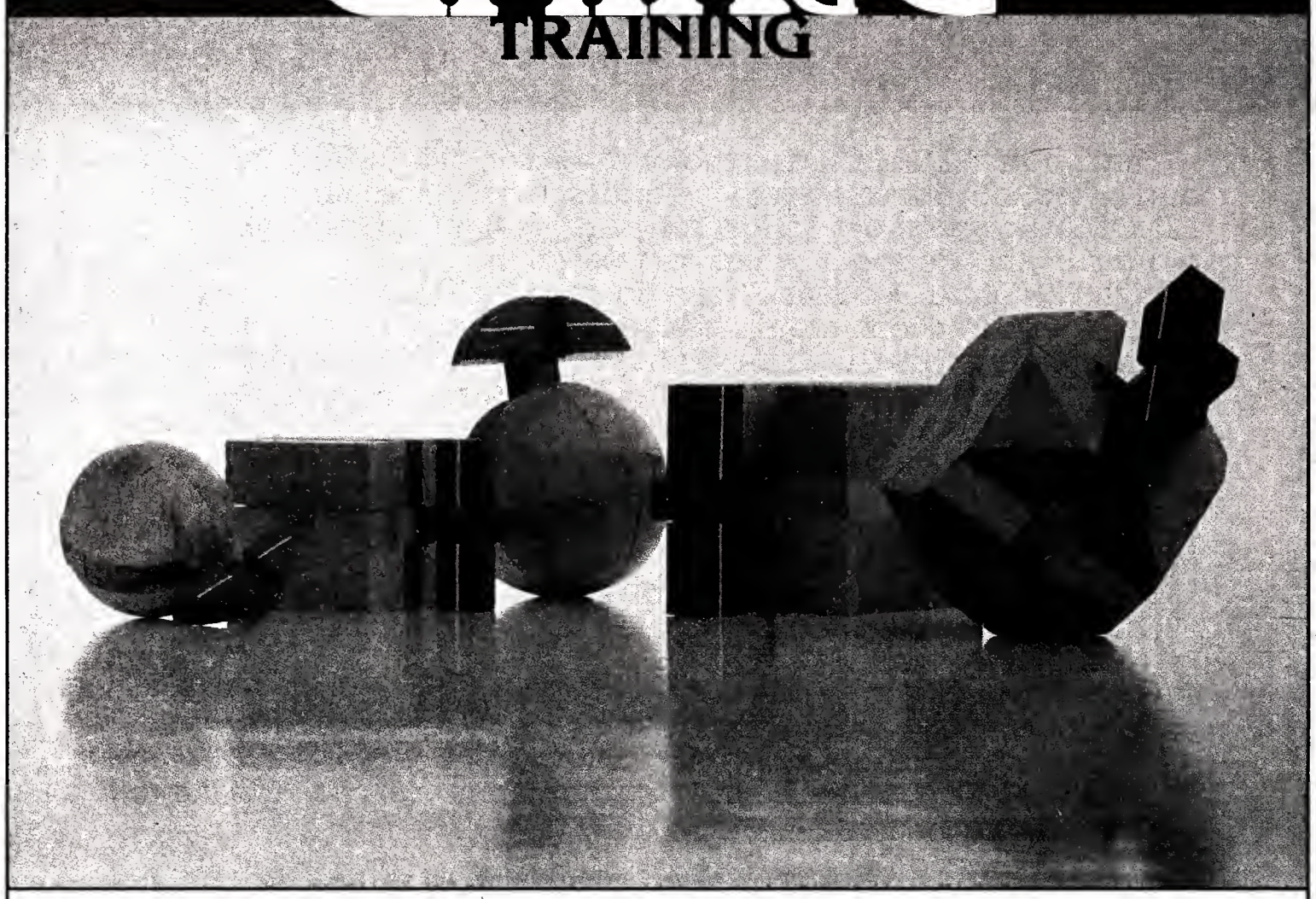
Interface consistency

"A key [criterion] necessary to integrate distributed data applications is developing interface consistency that is independent of its location," Fertig said. "Both ends of the link should have a consistent user interface and be able to run identical equipment at both ends of the link." So far, this has not been achieved, he said. An IBM Personal Computer XT/370 running IBM's Ramis/II or Information Builders, Inc.'s PC/Focus software, coupled with an IBM VM host, would provide today's optimum distributed solution, Fertig said.

A critical problem that has until now prevented development of commercial distributed applications for intermachine and intramachine integration, he said, is the "layer six problem." (Layer six is the presentation layer of IBM's Open Systems Interconnect architecture that translates information between incompatible formats.) Layer six format translations are usually less than 70% accurate, Fertig said, resulting in serious degradation of source data during transmissions. It is possible to solve the problem, Fertig said, by using format translations to map data exchanges between incompatible systems or by sending rules and data simultaneously.

Offering the best solution to date, Fertig said, IBM has developed three architectures — the Document Interchange Architecture, Systems Network Architecture and the Document Content Architecture — that "act as a glue" to solve portions of the integration problem.

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Computer collects campus crime statistics

By Donna Raimondi
CW Staff

ALBANY, N.Y. — Crime reporting requirements in the state of New York recently served as a vehicle to test the state university's new data base management system (DBMS) and fourth-generation language.

The State University of New York (Suny) is comprised of 375,000 students and 40,000 employees dispersed throughout 29 campuses all over New York. To keep track of crimes on the various campuses, Suny security staff members send crime data to the state computer center in Albany, said Tom Rysedorph, assistant director for systems development at the Research Foundation at Suny-Albany.

The computer center processes the information and forwards it to the state's criminal justice department once a month to satisfy state crime statistics requirements, he said.

Suny's security officers had never used the university's computer facility, which runs an IBM 3033 under MVS/CICS, Rysedorph said. When the university acquired an Applied Data Research, Inc. (ADR) Datacom relational DBMS and ADR's Ideal language this year, security requested a new crime reporting system that would allow its officers to enter data interactively and to generate ad hoc reports for its own use as well as the statistics for the criminal justice department, he said.

With the old system, security staff members filled out paper forms and forwarded them to punch card/data entry staff at the computer center in Albany, which collated the information on tape, put it through several batch programs with interim edit/audit lists and returned the tape to the security director for error checks, Rysedorph said. Once corrected, the tape was sent on to the criminal justice department, he said.

Exercising options

Members of Rysedorph's group looked at the request for a new crime package as a pilot to help them fully understand the new products, he said. "We wanted to exercise all the options and alternatives available to us and throw in all kinds of problems in order to adapt to users' needs as they become more sophisticated," he said.

The ADR system had been acquired after a search of other DBMS, Rysedorph said. "We felt that [IBM's] IMS belonged to major corporations with data base staff in the hundreds and multiyear development cycles," he said. Cullinet's IDMS needed a highly technical data base administrator, he said. "It is very hard to obtain data administration at a high level given the salaries of state employees," he added. For the Datacom relational DBMS, the data base administration is less technical, more administrative and more user-oriented, he said.

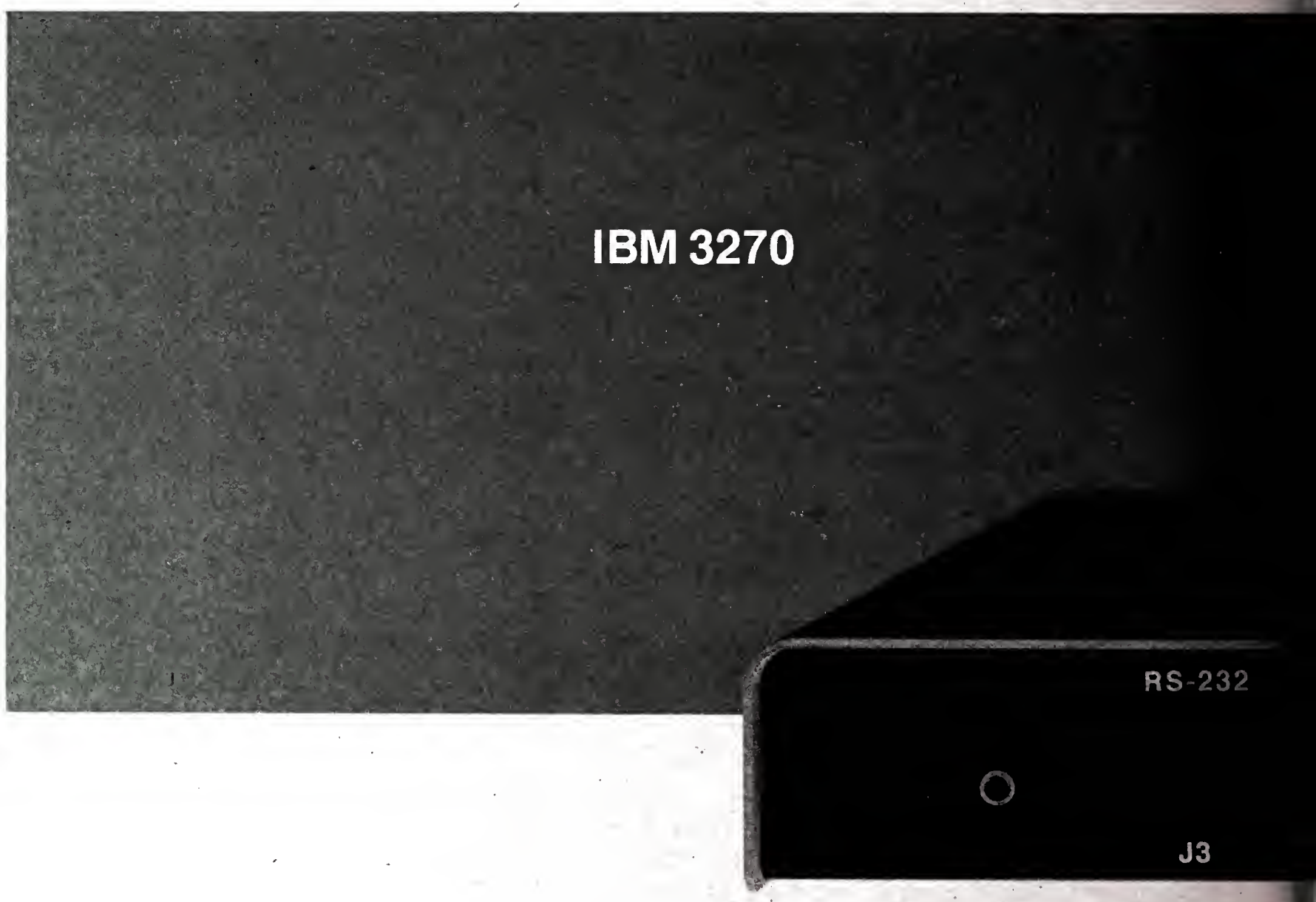
The fiscal constraints of the university also had a lot to do with the Crime Incident Reporting package's design, Rysedorph said. Little money is available for training, and New York's snowfall will make it difficult for users to travel to the center in Albany for training, he added.

"We placed procedures into Help panels that users can access by hitting a function key when they get an error message. We also provided a function where they could hit a button and get all the errors found on a screen," said Ralph Bennett, senior project leader.

Bennett trained personnel from three pilot campuses in Binghamton, Canton and Potsdam and found that training in the application itself was easy, he said, but familiarizing the staff with computer use in general was difficult. "They got hung up on getting their passwords in correctly," he said, and they had some problems figuring

See SUNY page 35

IBM 3270 users: you can the mini/micro universe



Click. Flip the switch on the Matchmaker 2000 and your 3270 terminal thinks it's a VT-100. Now you can communicate with a micro or mini computer. Access data networks such as Dow Jones and The Source, as well as local area networks, such as Net One. Send and receive electronic mail. Now the whole universe of ASCII is open to you.

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NEWS

Computer counseling may reduce marital stress

By Donna Raimondi
CW Staff

MIAMI — To the list of dedicated ministers and psychologists who specialize in alleviating marital stress, add one Sperry Corp. computer.

Mathematicians at the University of Miami here are using modeling techniques to identify and prevent sources of conflict in a marriage, said Dr. Bernard Howard, professor of mathematics and computer science.

People are like black boxes; they have finite states that include input, internal and output states, Howard said. As a result of input, the internal and output states change, he added.

Howard and his affiliates have spent the last 15 years developing a system of pinpointing behavior, rating the behavior on indexes and identifying alternative actions that could act as a tool to help reduce stressful conduct, he said. The computer simulates the dynamic behavior of the system from all possible internal situations and displays a tree to show possible behaviors. It computes various indexes — strife, compatibility, acceptability — and gives a "batting average" from zero to 1,000.

Each member of a couple answers a set of eight questions that Howard and his team designed to reflect the internal state, he said. The computer then analyzes current behavior, and a psychologist validates the results. Once the analysis is accepted, an index is given and the computer searches through all possible changes each individual could make to increase successful conduct.

Howard and Dr. Henry Kunce — a former Presbyterian minister/counselor and now a behaviorist at the university — wrote 30 programs in two classes (discrete and continuous modes) to apply to interactive behavior. They tested their programs by running more than 300 cases Kunce had worked on in his counseling days through the system, and the computer simulated what had really happened in every one of those situations, Howard said.

Dr. Joseph Kunce, a psychologist at the University of Missouri, experiments on couples and gathers data, which Howard and Henry Kunce process on a Sperry 1100/82 mainframe.

His research team has experimented on corporate decision-making processes and racially tense political situations; the hope is to someday use the system for smoothing relations between world leaders, arbitrating labor conflicts and defusing racial conflicts, Howard said.

SUNY from page 34

out how to access their IBM 3101 or 3278 terminals via different control unit devices."

Another problem with training has been that the Justice Department insisted on 100% accuracy in the new reporting methods, and the security department was used to allowing errors they considered to be noncritical.

For example, said Platt Harris, director of university public safety, the only traffic violation allowed on the criminal justice report is driving while intoxicated, but the security department had previously included other traffic violations for its own information.

Now, everything has to conform to justice department rules, Bennett said, and it has taken the users a while to realize that they have a tool that will readily tell them what is unacceptable so they can fix faulty reports.

Rysedorph's group prepared itself to write the program by attending users group meetings in Boston, Toronto and upstate New York, and by talking frequently with ADR's technical support people.

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UK firms plagued by misguided DP purchases

By Lisa Israel
Special to CW‡

LONDON — A subsidiary of a large UK manufacturing company spent two years developing a production and control system without producing a single working application.

The company's data processing department, which recommended a mainframe for the application, now recognizes that it made a mistake and has turned to a minicomputer to do a quicker and cheaper job.

According to Max Hand, a management consultant at the firm of A.T. Kearney, "Top and middle management should have controlled that project, not DP. If you leave it to DP, you will get the wrong solution."

Hand reached his conclusion after researching the use of information technology at more than 200 companies. Backed by the UK's Department of Trade and Industry and the Institute of Administrative Management, the research arrived at one horrifying conclusion: 20% of an estimated $5 billion to $6 billion in computer spending in 1984 will go to waste.

The study divided informaton technology users into "leaders" — companies that are coming to terms with information technology — and "laggers" — companies that leave themselves behind. The study found that only a quarter of the companies surveyed fit into the first category.

The rest are making all kinds of mistakes, according to Hand. "They are buying the wrong machines, spending too long or too much on developing systems and not getting the most from them when [the systems are] installed."

Hand tells hair-raising stories of money misspent at large and small firms in fields ranging from finance to construction to local government.

Hand places the blame firmly at the door of top management for not setting the right objectives for their DP departments. "Lagging companies do not really know what to do with technology. They don't understand it. It is almost an embarrassment to them, so they do the traditional, easy things," he said.

An example of this approach was used by one well-known construction company interviewed by Hand, which had all the right applications, but failed to win full benefits from automation.

The firm had put its accounts on computer, but still carried out its annual consolidation by hand. It also had a payroll package for several thousand employees but worked out some calculations manually. Employees were working as hard with a computer as they had without one.

"This particular company didn't know what the hell to do with information technology," Hand said. "The DP department was too busy responding to immediate requests. If they had sat back and thought about it, they could have automated functions on their construction sites."

Without confidence in its own judgment, top management shifts responsibility for DP decisions to DP managers, who then make the wrong decision. This is because DP managers do not always know the computer strategy that will best help a business, Hand maintained. "Nor should they be expected to; they are trained to find technical solutions, not to formulate business tactics."

Cost justification of computer-related projects is another problem for companies because so many of the benefits from computerization come in crossing intracompany barriers that managers find difficult to cross.

It is also a problem because savings are difficult to quantify from piggyback benefits like electronic mail or office automation. The survey estimates that confusion over job-costing can prevent firms from seeing more than 70% of the benefits of information technology.

'Bouncing off a brick wall'

Furthermore, even when DP managers recognize that computers are not being used to full advantage, bringing recommendations to the board's attention is like "bouncing off a brick wall," Hand claimed.

"DP managers do not always know how to put forward a business case for a better system. ... In short, what the survey identifies is a gap between business strategy and computer policy."

Top managers need to change their attitude toward computers, Hand advised. "A system is not just a big box that maximizes staff productivity and saves on wage costs," he said, adding that the latter is the stated aim that outweighed all others for computerization by 80% of companies surveyed.

"Information technology must be aligned with a company's business strategy," Hand reiterated. "A firm must work out what it wants to do and then work out what it wants from information technology. This has got to be done by top management, and it's a strategy that can then be implemented by DP managers."

Israel is a reporter with Computer News, *the UK-based affiliate of* Computerworld.

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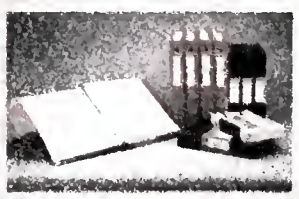
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Information technology critical for market edge

By Lisa Israel
Special to CW‡

LONDON — Businesses must use information technology to win a competitive edge over their rivals. To exemplify this, management consultant Max Hand cited a bank here that established a viewdata home banking service.

"In a sector where many of the biggest banks are still working to computerize their front and back offices, viewdata and information technology have created an opportunity to find a market niche," Hand said.

"How do customers choose a bank?" Hand queried. "Either they go for the well-known names, or they look around for a bank that offers special perks. A home banking terminal with access to Prestel [the UK's videotex system] may well prove a winning attraction."

While there is not one simple solution to making the most of information technology, Hand cautioned, there are similarities among the people who are most successful in implementing technology:

- A board member with responsibility for information technology. Information technology must be drawn into top management by the most appropriate person.
- The board must define information technology requirements and state them in business terms, not technical ones.
- Requirements must be detailed and realistic, using cost justification techniques that will focus on real benefits.
- Spending on information technology at the project level should be sanctioned by the board and not by DP managers.
- Top and middle management, not DP management, should control and monitor information technology products.

For incentive, Hands claimed that companies leading the way in the use of information technology are six times more likely to have a higher average return on capital in their main businesses.

Israel is a reporter with Computer News, *the UK-based affiliate of* Computerworld.

Standards directory out

WASHINGTON, D.C. — The National Bureau of Standards has issued a directory of standards developed by trade associations, technical and professional societies, federal agencies and state governments.

"Standards Activities of Organizations in the United States (SP-681)" summarizes the activities of more than 750 organizations in the U.S. as well as 420 private sector groups. The directory also contains a list of 632 nongovernment groups that develop standards, contribute to the standardization process or are sources of documents and information.

The standards directory, stock number 003-003-02602-6, is available for $13 prepaid from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Unix users meet set for January

DALLAS — Uniforum '85, the International Conference of Unix Users, will be sponsored by Usr/Group at Infomart here on Jan. 21-25, 1985.

Fourteen all-day tutorial sessions will be held on Monday, Jan. 21, and conference sessions are scheduled in four tracks: office systems, personal computers, engineering/programming and market trends.

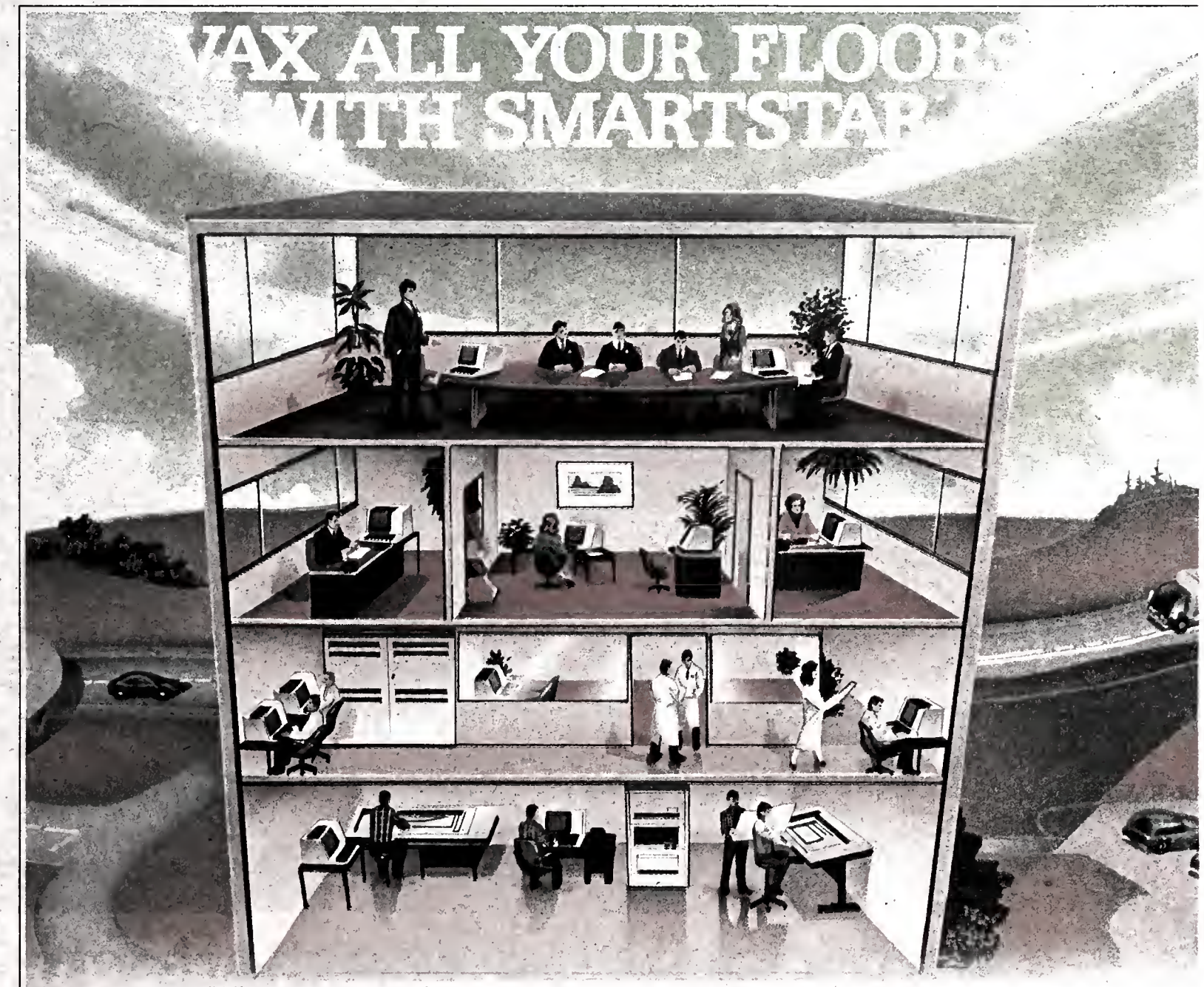
Vendors of AT&T's Unix hardware, software and services will exhibit their products at the international event.

Registration fees

Registration prices are as follows: for the show only, there is no fee if preregistered, and registration is $10 on-site; for the tutorials, there is a $100 fee if preregistered and it costs $150 on-site; and the price for the conference is $125 in advance and $175 on-site.

Special conference rates apply for members and students.

More information is available from Uniforum, which is located at Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.



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NEWS

Foreign vendors showcase wares at Comdex

Japanese, Australian, English vendors highlight product introductions in '84

By Susan Blakeney
CW Staff

LAS VEGAS — Among the 1,400 exhibitors at the recent Comdex/Fall '84 here were several international vendors looking for customers, dealers or partners in the U.S.

Fujitsu Microelectronics, Inc. unwrapped its Micro 16SX, an Intel Corp. 8086-based personal business computer that features 384K bytes of random-access memory, a 10M- or 20M-byte built-in Winchester hard disk drive and a 360K-byte, 5¼-in. half-height floppy disk drive. The machine is also equipped with a real-time clock with battery backup, a serial communications port, a parallel port, a graphics subsystem and an eight-color monitor. The system can operate on Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M 86 or Concurrent CP/M 86 operating systems, a spokesman added. Pricing on the Micro 16SX begins at $4,250.

Time Office Computers of Australia showed the Emu Ergonomic Workstation and the Kookaburra Portable Computer. The Emu was designed by Ferdinand A. Porsche's Design Studio to meet all presently documented ergonomic standards. The screen features six-directional motion and leaves no footprint on the user's desk as it is suspended by a moveable arm. The keyboard is sculpted and padded and comes complete with a hand rest bar. Pricing on the workstation starts at $5,000.

The vendor's Kookaburra machine is an Intel 80186-based, 9-lb system featuring up to 256K bytes of random-access memory, three ports, bundled MS-DOS 2.1, word processing, spreadsheet and diary software. The system can run on battery or main power supply. It costs $2,200.

Also from Australia was the Squirrel Ltd. Relational Database Management System, said to offer the same capabilities as IBM's SQL fourth-generation language to users of micros, minis and mainframes. The software also features data manipulation capabilities, security control and indexing and data definition facilities. Pricing starts at $2,400.

NEC Information Systems, Inc., the Boxborough, Mass.-based subsidiary of NEC Corp., unveiled an electronic mail system that enables up to 10,000 users of the vendor's Astra 300 VS series of 32-bit minicomputers to communicate with each other. Priced at $2,000, Astra Electronic Mail sends and receives messages within the Astra system from workstations, personal computers, portables and asynchronous terminals, according to the vendor. Multiple copies of up to 10,000 can also reportedly be sent to the system users.

Sony Corp. introduced its Compact Disk Read-Only Memory (CD ROM) product, which offers 540M bytes of memory on a single 4.72-in disk, which the company said has 500 times the capacity of conventional floppies. Digital encoding techniques combined with laser optical technology form the basis of the CD ROM format, originally devised in conjunction with Philips Information Systems, Inc. as a high-fidelity audio storage medium, according to a vendor spokesman. Sony intends to deliver samples of this product during the first quarter of 1985.

Sony also expanded its line of high-resolution Trinitron red-green-blue monitors. The additions included 9-, 12- and 13-in. screen models. All three are compatible with the IBM Personal Computer product line, and pricing starts at $550, the vendor said.

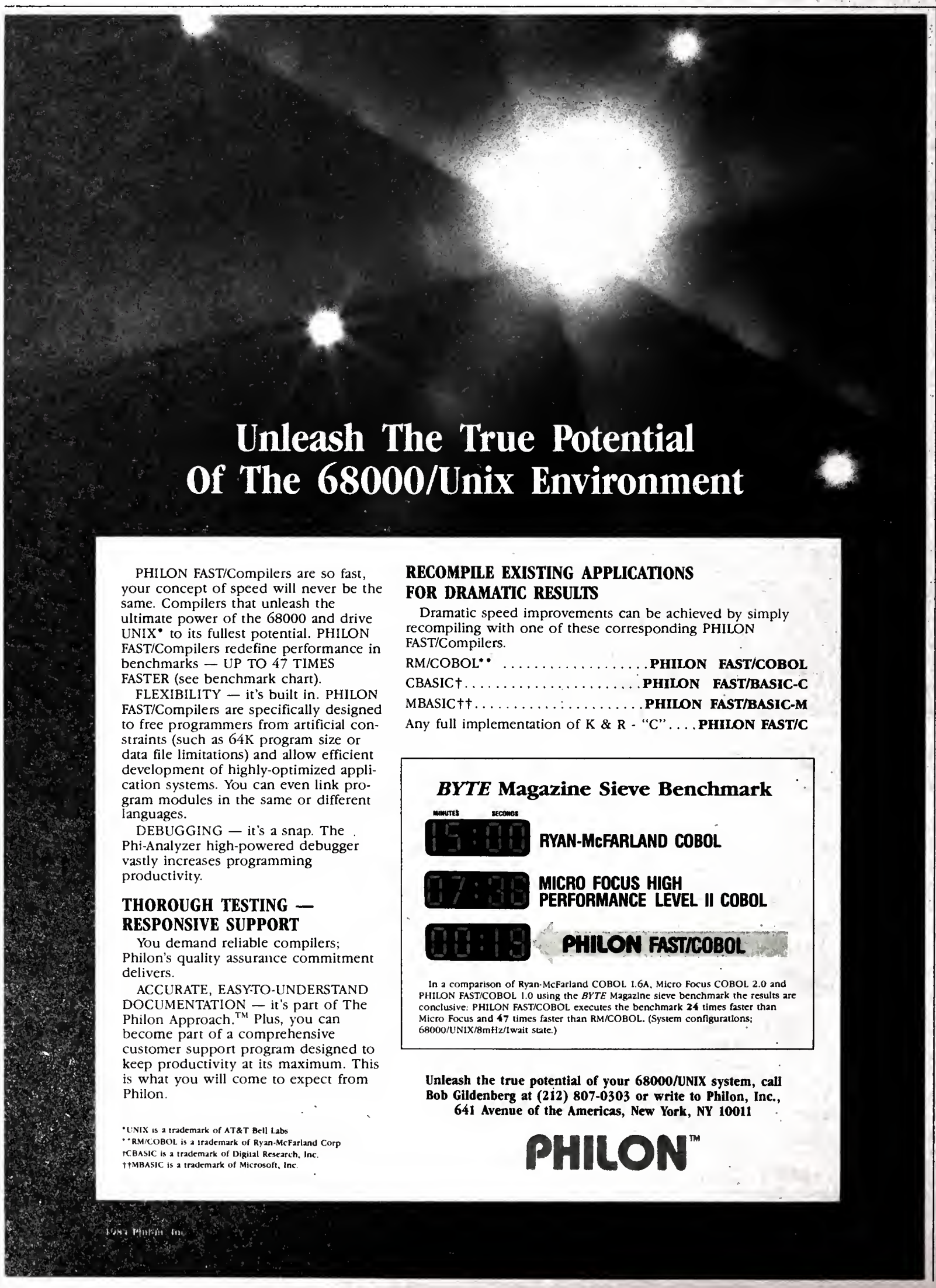
The UK's Newbury Data Recording introduced Penny, a 3½-in. fixed-disk drive offering 50M bytes of storage and an average access time of 40 msec. It costs $5,000 per drive.

Aimed at life cycle control

Introduced by Yard Software Systems Ltd., also of the UK, was Lifespan, an automated configuration management system. This product was designed to allow managers and developers more control over their software throughout its life cycle. Lifespan runs on Digital Equipment Corp.'s VAX line of machines using VMS. Lifespan does not require extra staff to implement, nor will it slow down the software development process, according to the vendor. It is priced at $19,000.

Apricot, Inc. of the UK unveiled the Apricot F1s, a 512K-byte version of its F1 entry-level business micro. With a price tag of $1,995, the F1s features an 8086 microprocessor, 512K bytes of random-access memory (RAM), expandable to 768K RAM, a 720K-byte, double-sided 3½-in. disk drive, infrared keyboard, color graphics and an optional mouse.

Apricot also introduced the Apricot Portable, a 13-lb system equipped with many of the same features as the vendor's F1 micro with the added features of voice recognition, infrared mouse and a full-size flat panel display. This machine costs $1,695.



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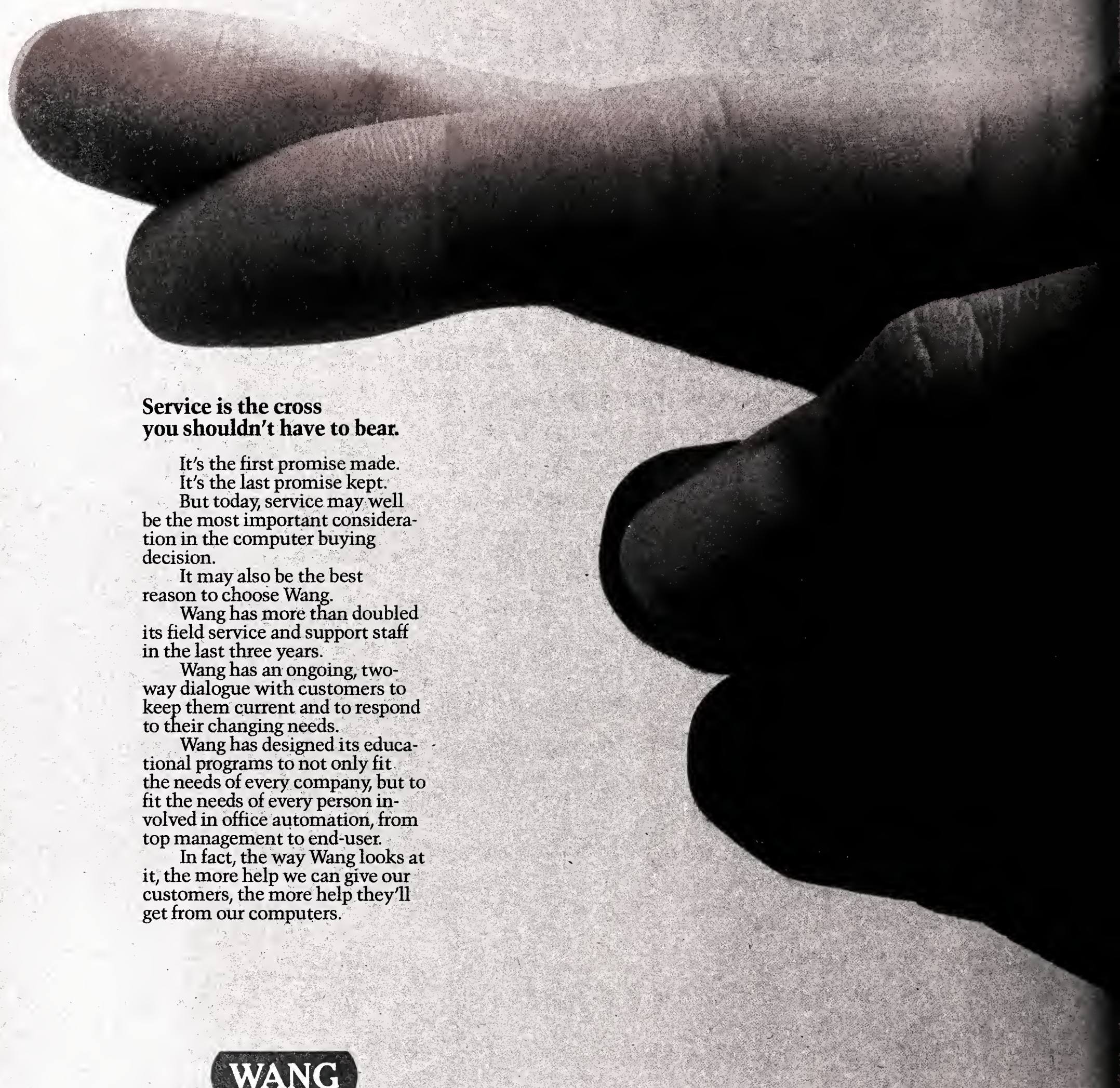
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NEWS

Europe facing marginal technological growth

By George Harrar
CW Staff

AMSTERDAM — Where is the European computer market headed?

The words and tone of Vittorio Cassoni, vice-president of corporate marketing for Olivetti S.P.A., conveyed an unmistakable pessimism about the direction of the European market to the sparse crowd attending his Comdex/Europe keynote address here recently.

"Without a development in favor of the new technologies," Cassoni said, "the decline of Europe is destined to continue. . . . Europe will not be in condition to participate with full rights in the new development cycle. It will sink to an increasingly marginal technological and economic position."

Cassoni outlined what European companies must do to stay in the running in the technological horse race now dominated by the U.S. and Japan. But at few points did he sound convinced his prescription would be followed.

Do not worry about technological and productive autonomy, he told his audience, because European firms cannot succeed by going it alone or even by uniting their own forces. Agreements with Japanese and U.S. companies must be the means to active participation in the development of new technologies, he noted.

More than 200 such agreements have been concluded, Cassoni said, but in many cases the European companies are simply passive partners operating from positions of financial and technological weakness.

Venture capital could permit the birth and growth of small companies in Europe as it has in the U.S., he added.

Discord does not permit optimism

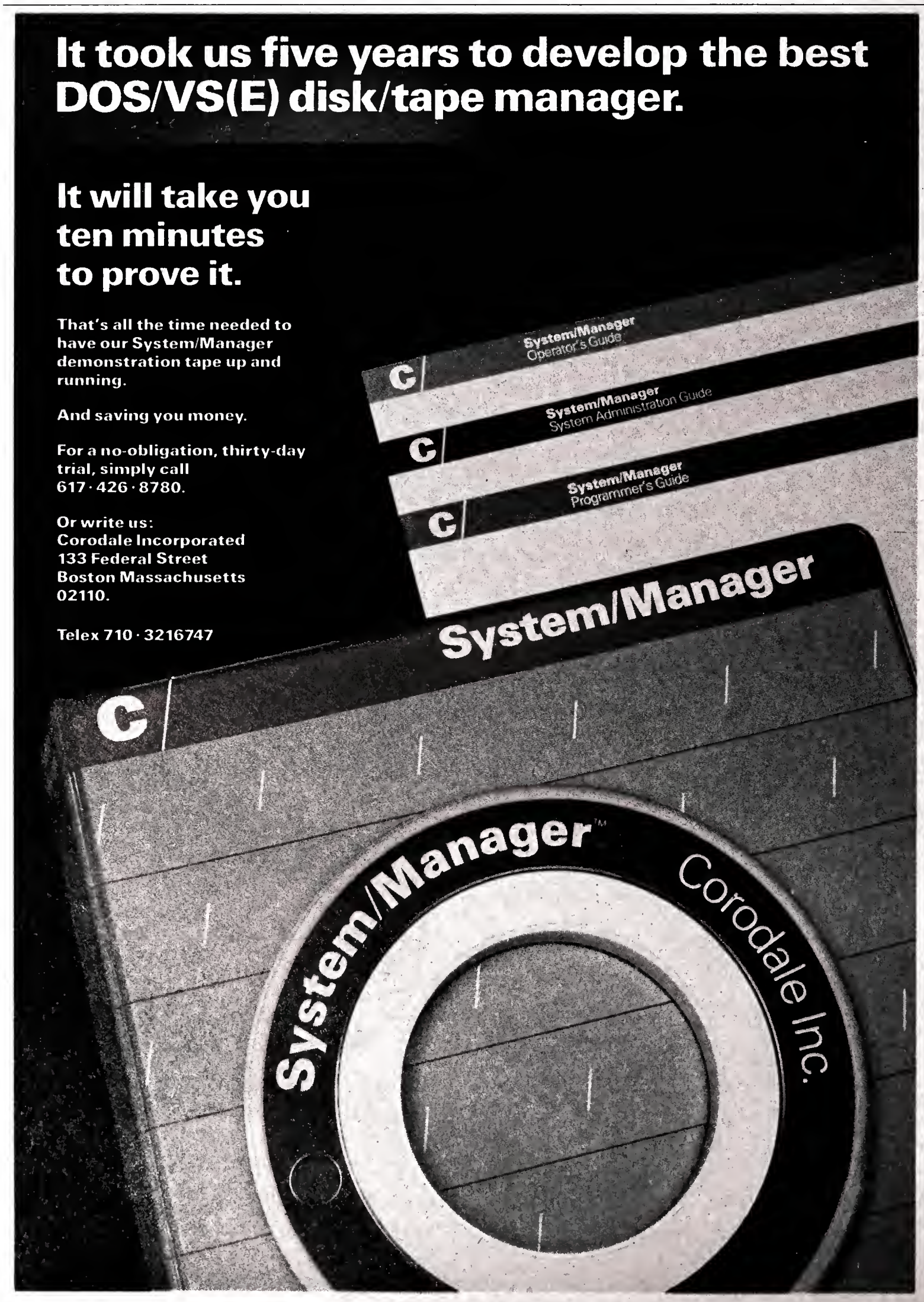
A strong home base for sales would strengthen European companies, and Cassoni called for a "more integrated and homogeneous" market. But he was bluntly realistic: "The political and economic discord that currently divides the European countries does not permit optimism on possible progress in the immediate future."

He cited figures illustrating the lack of dynamism in the European marketplace, both from user and vendor perspectives:

- At the end of 1983, an estimated one out of three U.S. white-collar workers used an office workstation, compared with one out of 12 in Europe.
- In the U.S., one in 10 white-collar workers uses a personal computer, compared with one in 30 in Europe.
- A European telecommunications company would need sales of at least $14 billion to reach typical profit levels, after an initial investment of $700 million to $1 billion to develop a new digital switch. That profitability would only be possible by the company's assuring itself of 100% of the combined digital switch markets of West Germany, Great Britain and France for the next decade.
- More than 80% of the companies controlling production in the information industry are U.S. firms, while 10% are European.

Cassoni concluded his lament about the European computer industry by describing a scenario in which Europe continues on its present course to becoming a marginal technological power. He ended by stating, "Let's hope it will not happen."

The third annual Comdex/Europe, which focused on small computer systems, had been expected to draw 10,000 visitors. The sponsor, The Interface Group, Inc., reported that 7,300 visitors attended.



Author slated to address office expo

WASHINGTON, D.C. — Tom Peters, coauthor of *In Search of Excellence*, will address the Federal Office Systems Exposition at the Convention Center here March 6.

Peters will share his findings on revitalizing corporations, continuing innovation, enhancing customer satisfaction, improving productivity and implementing strategy.

The author's research on companies has included 3M Corp., IBM, Digital Equipment Corp., Data General Corp., Hewlett-Packard Co. and Texas Instruments, Inc.

Peters first published an article in *Business Week* in July 1980 based on the findings of a survey on company excellence. The findings, published in book form by Peters and coauthor Bob Waterman in November 1982, became a best-seller.

The registration fee for the full conference is $200 by Feb. 4 and $295 thereafter.

Additional information on the conference and exposition is available from National Trade Productions, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

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NEWS

INTERNATIONAL REPORT
CW International News Network

CHINA

BEIJING — China will adopt more flexible policies toward foreign investment, State Councillor Gu Mu said at a recent investment symposium here. The councillor said the government was currently considering cutting income taxes for all enterprises using foreign capital. Preferential treatment would be given to foreign start-ups, and the old 30-year time limit could be extended for projects with heavy investments and long gestation periods. He also said the country would allow high-tech products to be sold in its formerly closed market in exchange for the advanced technology that China needs.

ENGLAND

LONDON — British Telecom is reportedly running into trouble with its Kilostream digital network, which is intended to provide business users with inexpensive private digital circuits. After the system was installed in several major companies, it was discovered that local exchanges were found not to be equipped with the necessary multiplexers to handle Kilostream communications.

FRANCE

PARIS — Matra Informatique, the French aerospace group, has joined forces with the Norwegian minicomputer maker Norsk Data A.S. (ND), to research and develop superminicomputer technology cooperatively. The two companies will be jointly working on new products, including a Cmos large-scale integration version of the ND 500 and a 32-bit workstation based on ND technology. Matra will control a French subsidiary of ND, which will manufacture and market the ND 500 supermini family in France in 1985.

JAPAN

TOKYO — Hitachi, Ltd. has developed a man-machine interface that reportedly can handle handwritten input. According to the vendor, the user writes on the display in much the same way he writes on paper, and the system matches the characters to its character set: 2,300 Kanji, Hiragana and Katakana characters, the English alphabet and numbers. The product is expected to come to market next year.

MEXICO

MEXICO CITY — IBM reportedly intends to open a major personal computer manufacturing facility here. If approved next month by Mexico's National Commission on Foreign Investments, the plan would enable IBM to become the first foreign micro maker to establish business here without giving up a majority interest to a Mexican partner. The Mexican government recently said it would allow a foreign firm to exert majority control in a Mexican company, provided the firm created a significant number of jobs, produced an exportable product and brought new technology to the country.

THE NETHERLANDS

AMSTERDAM — Prices on some 800 IBM software products here will be raised as of Jan. 1, according to IBM Netherlands. The average price hike will be 10%, although prices on some products, including the vendor's Information MVS, the OS/VS version of ACT/Vtam and the Data Base/Data Communication Data Dictionary, will jump 20%. In addition, license fees on VM/SP, VSE/Vsam, CICS under DOS/VSE and Sequel/DS will increase by 15%, an IBM spokesman said.

USSR

MOSCOW — The USSR reportedly has agreed to sell its first-ever supercomputer for export to India, with a delivery date slated for early next year. The only information known about the machine is its $20 million price tag, which places it in the same category as the Cray 2 from Cray Research, Inc.

The machine is thought to be an advanced version of the 200-million-floating-point-operations-per-second (Mflop) parallel processor shown at the Leipzig, East Germany, fair earlier this year. The Soviet supercomputer is understood to perform between 400 and 600 Mflops, sources said.

The supercomputer is said to be part of a larger deal with India, a country with which the U.S. has refused to do high-tech business because of the U.S. belief that the computers will be used for India's nuclear defense program.

WEST GERMANY

MUNICH — At the recent Integrated Telecommunications Congress here, German Postal Telephone and Telegraph (PTT) Minister Christian Schwarz-Schilling presented the PTT's plan for an Integrated Services Digital Network (ISDN).

The scheme calls for an influx of roughly $300 million a year to digitize existing networks by 1988. The German PTT is anticipating between four million and five million participants in its ISDN by 1990.

Forte introduces



NEWS

TURNAROUND TIME
Larry Long

Q During the last 25 years, I've advanced to a position of MIS responsibility with more than 100 people under me. I enjoy my job and would love to continue to advance within the company. But, there is literally no room.

Given this situation, I released my name to a search firm that got me an interview and a job offer.

Here is the problem. I could stay here and perhaps stagnate in my current position or, if I am promoted, I would most likely end up with about double the responsibility of my current job. If I took the job [offered by the search firm], I would be No. 1 in MIS in a much smaller company. If I leave the company, and if tradition prevails, I would have no opportunity to return to my present company. If I remain in my present position, I may have a one in four chance at the top slot but not in the near future. Any insight would be appreciated.

I could never recommend that someone wait for career opportunities to happen. Fast burners create their own opportunties, then take advantage of them. You could spend the remainder of your career waiting. Do you want a new challenge or do you want to wait?

Q A manager in another department purchased a couple of micros about a year ago, and he has been very successful in applying them to his department's needs. His success has gained a lot visibility for him and his department throughout the company. Their success is the impetus behind a decision to buy 40 microcomputers for distribution to other departments. My department, information systems, has been placed in charge of the evaluation, selection, acquisition and implementation process.

In a recent meeting, many of the managers expressed an interest in purchasing portable micros so they can work at home. Most of them have no experience with desktops micros. Do you think it is advisable to purchase portable rather than desktop micros?

I'm assuming that you are referring to portables, the lap variety, rather than the transportables. I define a transportable as a micro that can be packaged for movement and weighs about 30 lb. Practically speaking, these are a little heavy for frequent movement between home and office.

On the other hand, lap micros are so portable that they invite managers to include them with other briefcase items. Several available lap computers are at least as powerful as most desktop micros. The complaints that I have heard stem from the limitations of the liquid crystal flat panel display.

I would recommend that you select a compatible desktop and portable, detail the trade-offs, demonstrate the use of each and encourage the managers to spend at least an hour interacting with each system. Then, let them make the choice.

Given that your managers understand the trade-offs, I would expect that only those who truly need portability will opt for portable micros.

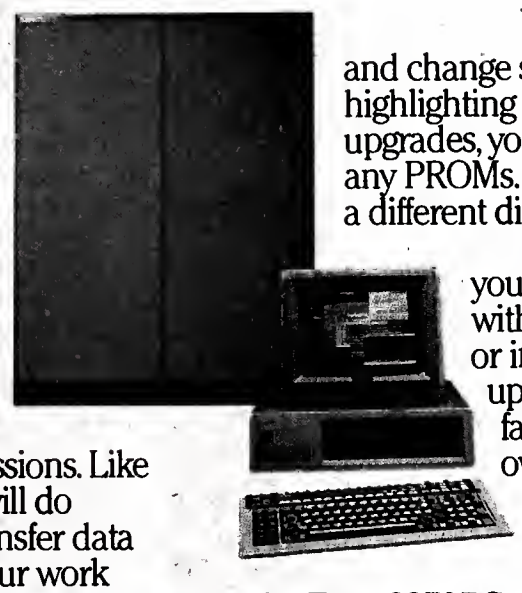
Q I manage a small customer service group whose primary functions are order entry and responding to customer inquiries. The information for most customer inquiries is not readily available, so we normally call back the next day.

I came to the conclusion that our company is technologically obsolete in DP and is going nowhere, so we decided to order a small computer with six workstations and implement our own system. The system will enable us to be more responsive to our customers. The disadvantage of the proposed system is that it will overlap with existing processing and result in some duplicate data entry, but the benefits seem greater than the costs. Our DP manager thinks we are wasting time and money, yet he offers no solution to our problems. Do you think we should wait on DP or proceed with our plans?

Information systems progress is not necessarily a function of state-of-the-art knowledge. As I talk with successful MIS and user managers, I am becoming more convinced that cooperation and willingness to learn are more important than keeping pace with the technology. Having your own system may be the answer, but before you create an essentially autonomous system, I would reestablish a dialog and an attitude of cooperation with the DP manager. Hopefully, your manager will reciprocate.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

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Micros topic of conference

SAN FRANCISCO — The National Institute for Management Research is sponsoring a three-day conference entitled "Financial Information Systems — Integrating Personal Computers," Jan. 30 to Feb. 1 here. The conference will be held at the Sheraton Palace Hotel.

Registration is $595. For three or more attendees, the fee is $295 for the third and subsequent registrants.

More information is available from the National Institute for Management Research, which is located at P.O. Box 3727, Santa Monica, Calif. 90403.

NEWS

Knight-Ridder tailors software to its needs

CHARLOTTE, N.C. — The data center staff of a newspaper publishing company here needed no help from reporters to dig up the hard-nosed facts about user access.

When users get on-line access to data through micros, workstations and distributed processing, data processing gets headaches trying to maintain security, according to Mike Presley, software support analyst for Knight Publishing Co.

"When you start supporting all of these tasks," Presley said, "you start exposing your system and data to all sorts of outside influences. This can be a little unnerving to a long-time DP manager. If you have a path to the outside world, you have a security risk. There is no way you can get around that simple fact."

Besides acknowledging this threat from outside on-line access, Knight recognized the possibility of unauthorized inside use. "A programmer can easily access sensitive files, like personnel or payroll, by simply submitting a batch job," according to David Orbaugh, director of Knight's advanced systems division.

When the firm decided to purchase a security system, it chose to pursue security through software rather than hardware, Presley said. The firm found hardware components such as performance monitors and automatic dial-back systems — with their related connect charges — too expensive to buy and maintain. "To obtain the security we needed by going the hardware route would have been prohibitively expensive," he said.

Knight looked for a software package that could protect data from breaches through either its on-line CICS facility or its batch system. "We look upon our data as an important company asset," Orbaugh said. "Any threat to its integrity is a major concern, so it seemed to be inappropriate to invest time and money in a security system that didn't protect both batch and CICS jobs."

Guidelines from a corporate auditor on the protection of resources, data files, batch partitions, programs and other data assets led Orbaugh toward a software security package, CA-Sentinel from Computer Associates International, Inc. "Everything that our corporate auditor had expressed concern about was included in the facilities of CA-Sentinel," Orbaugh said.

He brought the package to the attention of his division, and the division convinced the company's management to purchase the package. "We strongly recommended the system," he said, "because what we had seen up to then only included on-line protection. CA-Sentinel protects the entire system."

The data center at Knight, one of the South's largest publishing companies, is responsible for maintaining all of the company's business information. Knight, which is a subsidiary of Knight-Ridder Newspapers, Inc., publishes two papers, the *Charlotte Observer* and the *Charlotte News*, with a combined weekly circulation of 500,000.

Data center services

Services the data center performs include general accounting jobs along with advertising, marketing, customer service and distribution applications. The center operates two 4M-byte IBM 4341 Model 1 CPUs under DOS/VSE, with CICS/VS as its primary on-line facility. One remote terminal, used by Knight's circulation department, accesses the system.

Presley said CA-Sentinel secures information in one of two ways.

■ Through data restraints. When a person attempts to access data, the software looks for identifiers on the recording media that tell the system whether the user is authorized to use the data.

■ Through resource restraints. Physical resources such as terminal names and specific batch partitions can be taken off limits during any period of time.

Within these methods, the system administrator can selectively manipulate 18 security mechanisms. The package can restrict access to CICS files, programs, tasks, storage and transient data; can limit DL/1 I/O calls; and can control pseudo batch partitions within an interactive computing and control facility.

Choosing constraints

Using on-line menus that he can call up on a terminal, the system administrator chooses the constraints he wants to implement at any given time, Presley said. "The real beauty of CA-Sentinel is that we can tailor our security measures any way we want. We don't have to secure any more than we want to."

He said a DP shop must consider budgeting its security measures — protecting critical information more than less crucial data — so as to conserve valuable system resources. With the security software package, he said, "We have a nice balance between efficient data throughput and adequate data integrity."

Knight is looking into the possibility of interfacing micros to its system sometime in the future but has no firm plans right now, Orbaugh said.



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Standardization, training unite bank affiliates

TORRANCE, Calif. — When the nation's largest multistate bank holding company, First Interstate Bancorp, formed its data processing subsidiary in 1975, the company had DP facilities in each of its 21 affiliate banks.

"We inherited just about every brand of hardware known to man," said John Riggs, vice-president and corporate training manager of First Interstate Services, the DP affiliate that provided information processing services to the banking offices.

The challenge for First Interstate Services was first to standardize its hardware and software, then to train its users on the equipment. The equipment has since been standardized to IBM, and the DP affiliate has been organized into eight data centers nationwide staffed by 2,000 employees.

"By joining forces, DP services have improved. DP has a lot more leverage with vendors, and we've saved money by pooling resources," Riggs said.

But as DP technology spread through the banking network, DP training needs became more complex. Employees had a range of computer experience, and DP professionals needed to learn business skills. End users needed to learn how to use popular software packages and to access the bank's mainframes from more than 500 IBM Personal Computers.

In January 1983, a training department was formed within the service company's corporate structure, and Riggs went through a career change, crossing from DP to training management. He was charged with developing a companywide technical and nontechnical training program.

Program objectives

Working with senior management, Riggs outlined the following objectives for the training program:

- Offer skills training aimed at the appropriate personnel at the specific time required.
- Establish a comprehensive training resource.
- Provide uniform training to the distributed centers.
- Develop a coordinated approach to computer-based training (CBT).
- Set up a system for analyzing, monitoring and evaluating training.

The resources committed to achieving these objectives included a professional trainer, seven regional training managers, top-notch seminar presenters, skills training and management information courses from Deltak, Inc. of Naperville, Ill., and a $2 million DP training budget.

"Our biggest problem was that we often found ourselves reinventing the wheel in each regional center," Riggs said. "The quantity and quality of training varied. We needed a companywide training plan, a basic framework within which each center could work, with allowances for individual center needs and priorities."

Training needs are now identified at each regional data center. The program consists of in-house training for first-line supervisors, middle management, project management and end users; Deltak's video-based, self-paced technical and nontechnical training and its CBT for micros and mainframes; vendor-conducted hardware and software training; company-sponsored training; and outside seminars.

Technical skills training

Because the data centers are geographically dispersed and employees' needs so diverse, the technical skills training program was built around video- and computer-based training courses from Deltak. Deltak courses address a broad range of DP subjects such as MVS/SP JCL; command-level language for IBM's CICS; and Information Builders, Inc.'s Focus, a fourth-generation applications programming language.

"The main strength of Deltak's courses is that they can be delivered on-site; you don't have to take people away from their jobs," Riggs said. "As a result, we can offer ongoing technical training to our staff whenever it needs it."

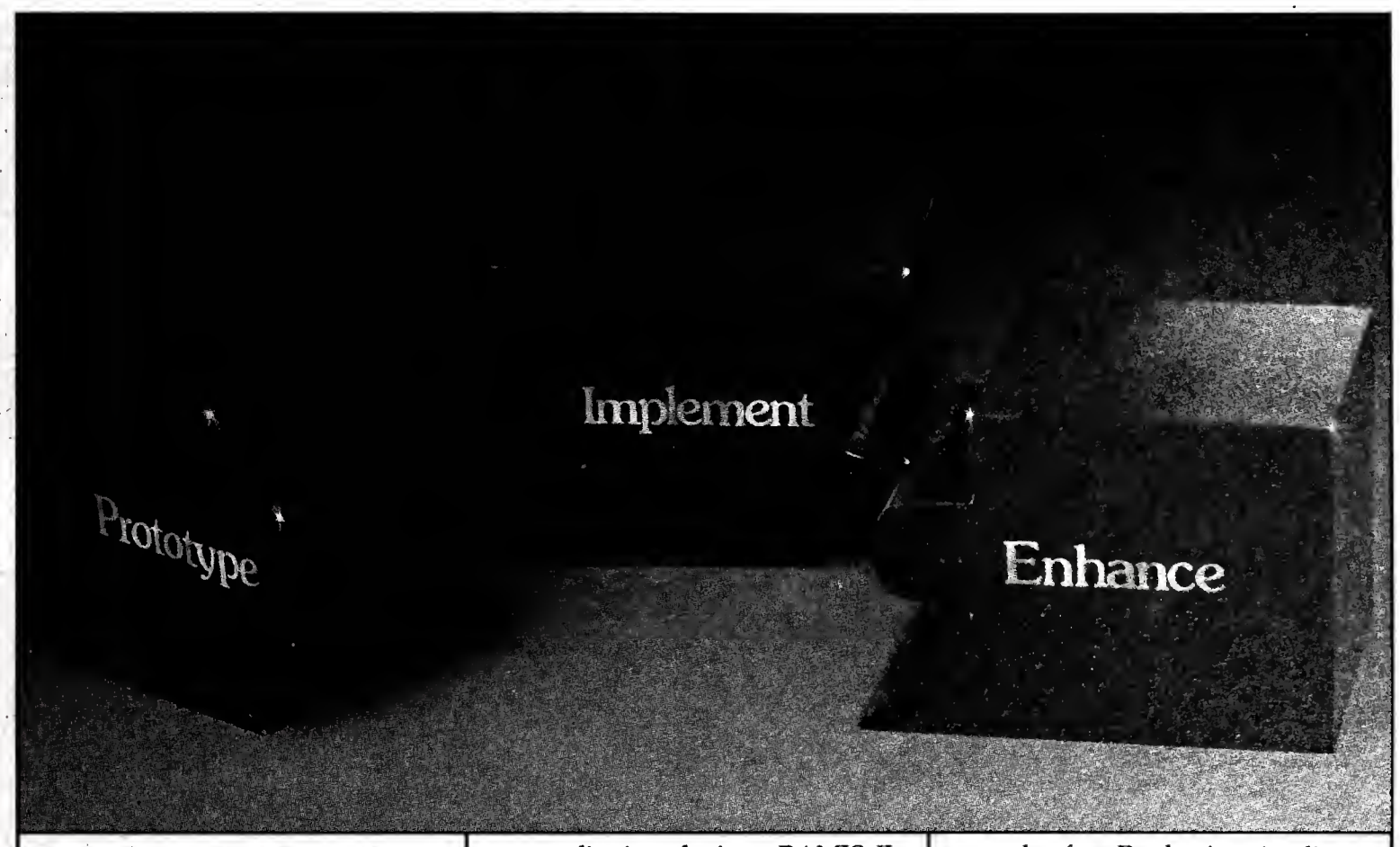
As microcomputer use spread throughout the banks, end-user training became a high priority. End-user computing services and training are provided through information centers associated with four of the regional DP offices.

Infofast, the first and largest First Interstate Services information center, is located in Los Angeles. It serves more than 700 users, primarily from the First Interstate Bank of California and the corporate holding company.

For the future, more emphasis is being placed on CBT. "We track the expense of training, but we don't track the cost of time away from the job required to complete training programs. As we become more sensitive to this, we'll use more CBT," Riggs said.

The bank is also considering a technology training program for senior management. This program would focus on DP management, strategy and technology. It would also address potential upper-level-manager-reluctance to becoming part-time DP students.

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NEWS

Restaurants eliminate paperwork, lessen errors

ATLANTA, Ga. — When Arby's Inc. wanted to put the bite on errors and improve efficiency in its system of collecting payroll data, it turned to the use of small terminals with attached acoustic couplers.

The terminals, each measuring five by three inches and weighing about half a pound, allow the managers of each Arby's restaurant to send what would otherwise be a mouthful of data — their weekly payroll information — to the corporation's IBM System 38 mainframe here at the firm's headquarters.

The system, in use since January 1983, has replaced verbal reports, which had once occupied 20 operators at a service bureau, the corporation's former payroll processing site. "We ended up with a 25% error rate with people transposing figures" under the previous system, recalled Bill Needham, manager of Arby's point-of-sale system.

The terminals are part of a data collection system called Toes, from Interface Technology, Inc. Each week, they are used to upload payroll information to an IBM Series/1 minicomputer, which creates data files and passes them on to the mainframe for later processing. Needham said Arby's was largely pleased with the terminals, called Port-a-Store units, though he found them "very sensitive to telephone line problems" and would like them to come equipped with automatic shut-off switches.

Without the auto-off switch, Needham said, managers are likely to leave the unit on accidentally. "We get eight to ten calls a week saying 'what's wrong with it,' and the battery is usually dead," he said.

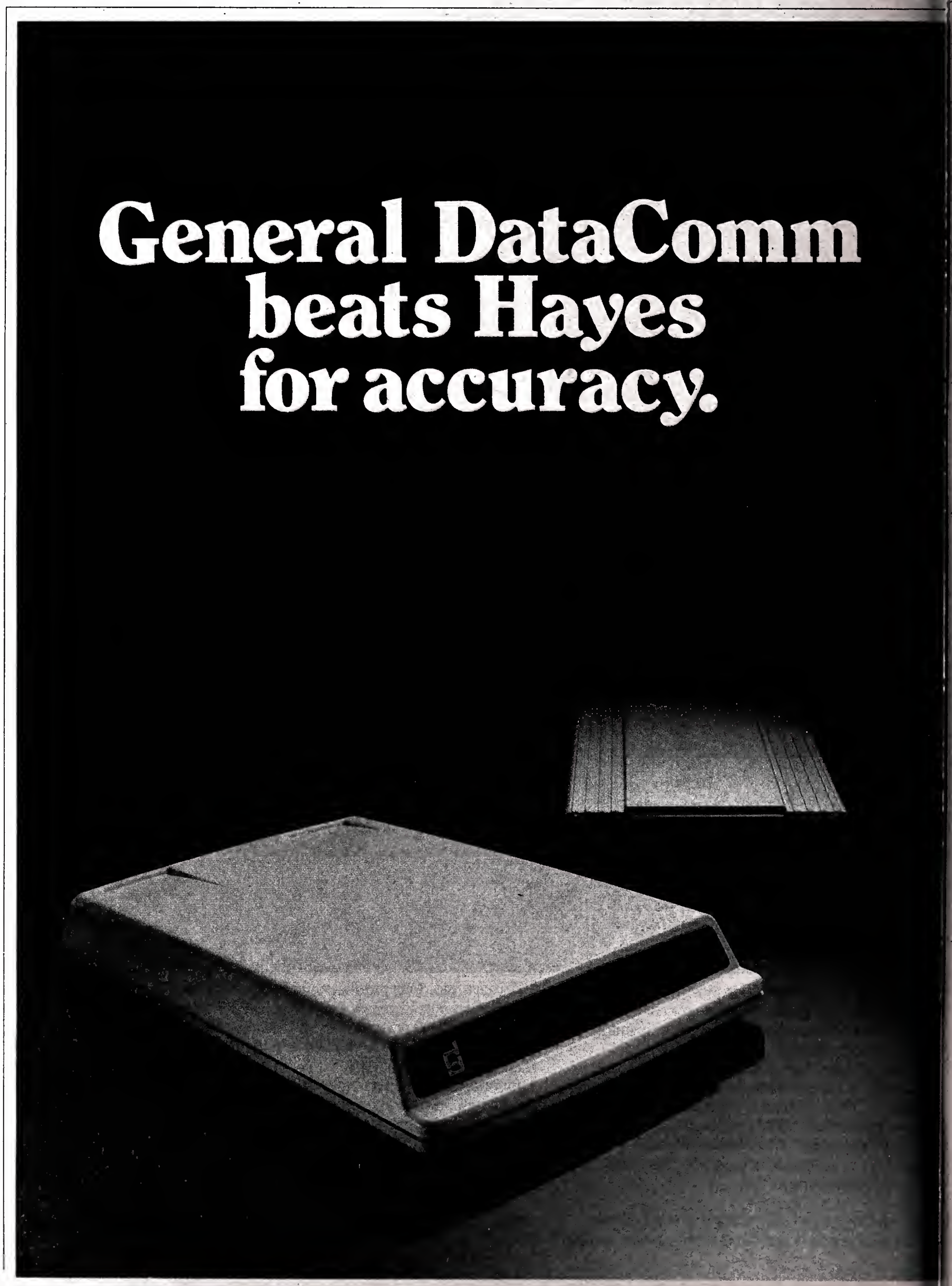
The terminals allow restaurant managers to enter payroll data (employee number, rate code, hours worked) into the Port-A-Store at their convenience, check it for accuracy, correct mistakes and add or delete lines. When the manager is sure the data is accurate, he calls the Toes computer at Arby's headquarters. An electronic voice answers with, "Hello, this is Arby-Net, please enter unit number and security code."

The manager positions the terminal to the first line, attaches it to the telephone mouthpiece and presses the transmit button. The terminal transmits the unit number and security code using Touch-Tone signals and the computer checks the code and prompts the manager for the next information.

The Toes voice repeats each entry before it prompts for the next line so the manager can check for accuracy. It also reportedly informs the manager of any errors and allows him to cancel lines and make any changes before they sign off.

The benefits of the Toes system have included a reduction of three or four minutes in the amount of time managers spend transmitting the payroll data — it had taken them as much as a half hour previously — and a reduction in errors, Needham said. In addition, the Arby's MIS department reportedly can generate a report showing which restaurants have not yet entered payroll data for the current period. This is said to expedite the collection of late reports and promote efficient closing of the pay period. The number of calls made by each restaurant and the time spent on each call can also be monitored, enabling problems to be isolated quickly.

In December 1983, Arby's added coupon sales and product sales reports to the Toes system. These reporting applications give Arby's the latest sales information.Each coupon promotion can be evaluated almost immediately from coupon sales reports, whereas before it took several weeks to gather information, compile it and then analyze the effectiveness of each promotion.



NEWS

Supplier boosts output with electronic printer

WICKLIFFE, Ohio — Two years after it switched to an electronic printing system, Bailey Controls Co., a process industry supplier based here, found it was saving $64,000 in paper and printing costs annually. It is also getting more printing done and getting it done faster, according to DP operations manager Leonard Bruno.

One of the biggest cost savings for Bailey, Bruno said, was derived from the 9700 printer's ability to print in duplex, using both sides of a sheet of paper. "We figure we save between $2,500 and $3,000 each month in paper costs alone, simply by printing in duplex," explains Bruno. "Our original goal was to print 75% of our output in duplex. Now, it's been so successful that we're at about 90% duplex printing."

Bailey's savings in paper costs, however, were not due entirely to the acquisition of the new printer, Bruno noted, but also occurred because of the firm's war on paper waste — which saved it $42,000 and cut paper use by 20%. The firm designs, manufacturers and markets high-technology instrumentation and control systems.

Prior to leasing the Xerox Corp. 9700 electronic printer, Bailey's NAS 6650 computer, running under an MVS 3.8 operating system, was generating some 1.5 million pages of output every month, supplying the company with documents ranging from proposals for customers to time-critical daily inventory and order processing reports for manufacturing, according to Bruno.

To keep up with the heavy demand, Bruno said, two Xerox 1200 series nonimpact printers ran almost around the clock, and overtime costs averaged $500 per month.

The 9700 printer handles between 500 and 600 jobs daily, Bruno said, and has allowed the firm to increase its accuracy in meeting printing schedules from a little over 99% to 99.8% — with less than 2% downtime. "It used to take us two whole shifts to print all our reports," Bruno noted. "With the 9700 printer, we finish in plenty of time, and we can get more out if necessary. If we run into a problem, the speed of the 9700 allows us to recover and still meet our deadline."

The company runs the 9700 printer on-line, printing on plain 8½- by 11-in. paper at up to 120 pages per minute.

The computer-controlled printer uses xerographic printing, under which a laser beam creates images on a photoreceptor belt and the images are transferred to paper. The 9700 prints numbers, text, logos and forms.

Bailey's printing manpower requirements have also been reduced, saving $23,000 yearly, Bruno said.

Now, he said, only one operator is needed to monitor the laser printer during its heaviest use, and less operator handling is required because reloading toner and developer is easier, and "fixing the jam . . . is twice as fast because the machine tells you exactly where to look."

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NEWS

Tool aids firm's DOS-to-MVS conversion

SOUTH BRUNSWICK, N.J. — When business operations at Dow Jones & Co.'s Computer Service Facility were reaching peak load last year, the company decided to change operating systems, hoping to streamline maintenence. But managing the conversion was not an easy task.

In 20 years, Dow Jones has gone from using batch systems running on the backup computer for a typesetting/message-switching system to an on-line system using approximately 300 terminals in 23 locations operating on three IBM 4331 Model Group 2 machines under DOS/VSE.

Handling a data storage increase of approximately 25% a year, in January 1983, the Computer Service Facility business staff consisted of 30 programmers, 22 operations people running three shifts 24 hours a day and 12 technical services people. With more than 25 systems and approximately 2,000 programs, the group was using 84 volumes of data, each with a capacity for storing 317 million characters. The site was rapidly becoming a large and complex environment requiring many DOS/VSE systems.

"It was time to stop and reevaluate our environment," said Jim Golis, systems project leader. "We were on the verge of becoming bogged down in sheer complexity. A conversion to MVS was a sensible alternative."

With that in mind, in January 1983, a project team representing the business areas of the Computer Service Facility was formed to research the possibility of converting from DOS to MVS. By spring, the group presented a conversion proposal to management.

The proposal included an inventory and evaluation of the current system environment, company growth projections, a detailed report on the business system, an implementation plan and breakdown of responsibilities throughout the conversion, estimated costs and cost justification. In June, the project team got the go-ahead.

An effective conversion tool

"One of the first things we knew we needed was an effective conversion tool for both JCL and Cobol source code," Golis stated. After examining the marketplace, Golis chose three systems to evaluate — IBM's conversion aids, Uccel Corp.'s Duo and Focus and a product developed by Arkay Computer, Inc. of Newton Centre, Mass. Arkay Computer was recently acquired by Computer Associates International, Inc., and Focus is now marketed under the name CA-Convertor.

Golis established a list of the requirements he expected to be filled by a conversion tool. "First of all, you want the conversion tool to do as much of the work as possible," Golis explained. "Conversions require minute attention to detail. . . . To experience hands-on training, you want your programmers to be involved in the process, but you have to reduce the amount of repetitious work and keep them challenged and motivated.

"Next," he added, "the conversion tool has to reflect and interface with your software and methodologies. Dow Jones has a mix of software products from a variety of vendors. You need a tool that will be compatible and function with the code of all those vendors. In addition, the package must be compatible with the standards and naming conventions at your site.

"The conversion package should also be able to monitor the conversion process," Golis continued. "It should report on progress — what has been converted and what has not. It should provide an inventory and cross-reference information on files, programs and jobs."

Maintenence, ease of installation and documentation as well as cost were also considered. Golis then set up a table and evaluated each of the three products on a scale of one to 10.

"CA-Convertor was the clear leader," Golis said. "It does the majority of work for us, and only exceptions are handled on a manual basis. This helps in the training process, for example, and also allows our staff to become actively involved at a non-tedious level. CA-Convertor reads the DOS source code, gives us a list of the OS code and creates an OS member directly in our source statement library.

"If there are exceptions, CA-Convertor shows us the lines of code [and] indicates what it did to correct them. We review the correction, and 95% of the time, it will compile."

Dow Jones' Computer Service Facility runs the conversion software during the day "just like another job," Golis said. "I would say it's the equivalent of about a quarter of a compile in runtime," he added.

CA-Convertor has interfaced with the vendor-supplied software at Dow Jones, according to Golis. "It has also helped us maintain our standards. With CA-Convertor, we provide the unit names we're using and the [direct-access storage device] information, and it sets up the space characteristics we want. It also sets up the OS data set names according to standards. If we were doing the

See **CONVERT** page 55

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NEWS

Accounting system aids firm's vendor payments

TORONTO — A corporation with 20 operating companies and a booming business cannot afford to stick to outdated methods of paying vendors.

Rogers Cablesystems, Inc., headquartered in Toronto, is a multiple cable system operator that serves nearly two million subscribers in Canada and the U.S. Until 1982, Rogers processed 2,500 invoices a month — payments from its 20 operating companies to more than 63,000 vendors — on an internally developed batch system, said Bruce McBurnie, manager of applications support.

In 1980, corporate executives decided to shop for an accounts payable software package that would allow all of its divisions to enter their data on-line, McBurnie said. The executives also wanted better control of charges to account numbers, he said. Major enhancements to the existing batch system were ruled out, since they would cost more than buying a new accounts payable package, he added.

Rogers selected the MSA Accounts Payable System from Management Science America, Inc. of Atlanta and had the system up and running by January 1983, according to McBurnie. Similar packages that the company looked at were not offered on-line at the time or were not on the market long enough to have been proven effective, he said.

The company now has one central processing location in Toronto for the Accounts Payable System that runs on two IBM 4381 computers under IBM's DOS/VSE operating system. The operating companies in Canada and the U.S. communicate via dedicated lines using IBM's 3278 remote terminals, McBurnie said.

Easier to spot problems

The new system has made the accounts payable process much more efficient, according to McBurnie. It is easier to spot problems and fix them immediately, he said. Vendors who call for information can get it quickly, instead of being put on hold while people search through file cabinets, he added.

All divisional reports go back through remote spooling and print at the remote location, McBurnie said. Many of the system's criteria have been standardized for all Rogers divisions by the corporate managers, he said. Options, however, are at the discretion of each division's management.

Many divisions use the system's recurring invoice feature for standard payments, McBurnie said. Once a contractual payment has been entered into the system, the computer takes over, eliminating the need for manual entry every month, he said.

Rogers' Toronto division sets up automatic payment dates and discount dates with terms of 2%, 10 days; net 30, McBurnie said. If the invoice clears the internal approval process on time, the system takes the discount automatically, he added.

Pauline Vancott, supervisor of accounts payable for Rogers' largest cable division, said, "If an error occurs, it flashes on the screen as we're working, and we can balance it immediately on-line." Some of the operating companies were using manual procedures before, and the new system saves hours of work at month-end, according to Vancott.

CONVERT from page 54

conversion manually, we would be faced with a collage of different styles of coding from the various members of the conversion team. Now we're getting good, consistent code that reflects our standards."

A conversion manager, the monitoring component of CA-Convertor, has helped Golis stay apprised of the progress of the project. Instead of talking individually to each member of the team, he can go to the conversion manager for a report of what has been converted and what still has to be done.

According to Golis, keeping management and the end users informed is one of the keys to a successful conversion. He holds weekly meetings with the conversion team and publishes the minutes of those meetings. He documents the results of the conversion for his end users.

For instance, Golis explained, "We ran a billing run for one of our systems which used to take 17 hours in DOS. It now takes less than eight hours. Visible results like this and the faster CICS response time have helped us get the maximum amount of cooperation from our users when we've had to freeze a system."

After management had approved the project and at the same time evaluated the conversion tools, Dow Jones installed a complete MVS system on an IBM 4341 to get the project under way. A conversion plan was also established by application and schedule dates.

"A DOS-to-MVS conversion has to be delicately orchestrated," Golis explained. "Here at Dow Jones, we were faced with 2,000 programs and 2 million lines of code to convert. One year into the project with the help of CA-Convertor, we are still on schedule in both time and cost areas.

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DECEMBER 3-4, TULSA, OKLA. — **Managing Information Centers Effectively.** Contact: Thomas J. Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-4, HARTFORD, CONN. — **IMS/VS Data Communications Programming.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-4, TIMONIUM, MD. — **Construction Cost Estimating and Control.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 3-4, SAN JOSE, CALIF. — **Operating Systems: A Comparative Analysis.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 3-4, COLUMBIA, MD. — **Local-Area Networks.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 3-4, NEW YORK — **Successful Integration of Micro and Mainframe: The System Architecture.** Contact: Grumman Data Systems Institute, Center for Professional Development, 250 Crossways Park Drive, Woodbury, N.Y. 11797.

DECEMBER 3-4, CHICAGO — **Local-Area Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

DECEMBER 3-4, ORLANDO, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 3-4, WASHINGTON, D.C. — **Personal Computer Communication Systems.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

DECEMBER 3-4, FORT LAUDERDALE, FLA. — **Discovering Lotus 1-2-3.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 3-5, BOSTON — **Controlling Software Projects.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, NEW YORK — **Backup Network Planning.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

DECEMBER 3-5, SAN FRANCISCO — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, WASHINGTON, D.C. — **Telecommunications Alternatives in the '80s.** Contact: Continuing Engineering Education, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

DECEMBER 3-5, WASHINGTON, D.C. — **Relational Data Base.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

DECEMBER 3-5, CHARLOTTE, N.C. — **Systems Project Management.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-5, WASHINGTON, D.C. — **National Conference on Government ADP and Telecommunication Acquisition Management.** Contact: Conference Manager, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

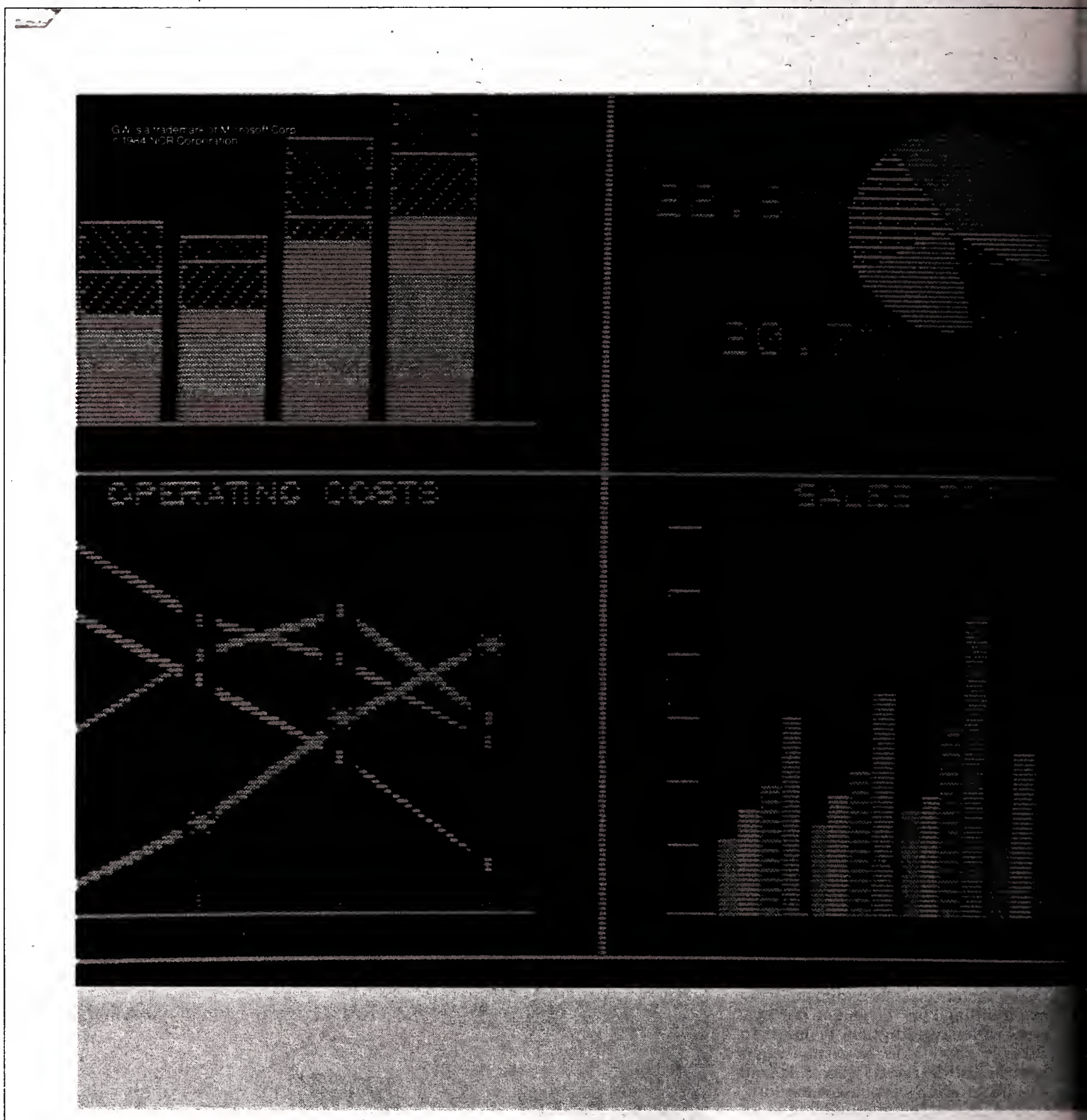
DECEMBER 3-5, NEW YORK — **EDP Disaster Recovery Seminar.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

DECEMBER 3-5, BOSTON — **Conference on Control, Audit & Security of Digital Equipment Corp. Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

DECEMBER 3-5, ORLANDO, FLA. — **ADS/On-Line Workshop.** Contact: Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 3-6, PORTLAND, ORE. — **Structured Analysis and Systems Architecture Seminar/Workshop.** Contact: Jane Crosswhite, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

DECEMBER 3-7, ORLAN-



NEWS

DO, FLA. — **CICS Programming Workshop.** Contact: Steve Withrow, Harris Education Center, Suite 507, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

DECEMBER 3-7, ORLANDO, FLA. — **Managerial Tools for Decision Making.** Contact: West Virginia University Research and Training Center, Suite E, 1 Dunbar Plaza, Dunbar, W. Va. 25064.

DECEMBER 3-7, HARTFORD, CONN. — **ANS Cobol Coding Techniques and File Applications II.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-7, DALLAS — **Marketing and Employer Development.** Contact: West Virginia University Research and Training Center, Suite E, 1 Dunbar Plaza, Dunbar, W. Va. 25064.

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DECEMBER 3-7, CHICAGO — **CICS Macro-Level Programming.** Contact: David Shapiro, Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

DECEMBER 3-7, HARTFORD, CONN. — **Systems Analysis & Design Workshop.** Contact: Don Florek, The Hartford Graduate Center, 275 Windsor St., Hartford, Conn. 06120.

DECEMBER 3-7, ST. LOUIS — **SMP Maintenance.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

DECEMBER 3-7, TORONTO — **Basic Systems Analysis.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-7, MAUI, HAWAII — **C Programming Workshop.** Contact: Suzanne Battista, Course Manager, Plum Hall, Inc., 1 Spruce Ave., Cardiff, N.J. 08232.

DECEMBER 3-7, DES MOINES, IOWA — **Advanced Systems Analysis.** Contact: Thomas Bisacquino, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

DECEMBER 3-14, PARSIPPANY, N.J. — **ANS Cobol.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

DECEMBER 4-6, SADDLEBROOK, N.J. — **Selecting a Local-Area Network.** Contact: Marketing Manager, Technology Concepts, Inc., Old County Road, Sudbury, Mass. 01776.

DECEMBER 4-6, LONDON — **Eighth International Online Information Meeting.** Contact: Jean Mulligan, Learned Information Ltd., Besselsleigh Road, Abingdon, Oxford, England OX13-6LG.

DECEMBER 4-6, WASHINGTON, D.C. — **Microcomputer Data Base Management Systems.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

DECEMBER 4-7, LOS ANGELES — **Digital Image Processing.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

DECEMBER 4-7, WASHINGTON, D.C. — **The 1984 Videodisk, Optical Disk, Compact Disk Conference and Exposition.** Contact: Mark Roseman, Meckler Communications, 11 Ferry Lane W., Westport, Conn. 06880.

DECEMBER 5, COLUMBIA, MD. — **Tax Reduction Institute Seminar.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742.

DECEMBER 5-6, WASHINGTON, D.C. — **Contemporary Telecommunications Management: Trials and Tribulations of Telecommunicating in Year 1 A.D.** Contact: Marilyn Chasteen, The DMW Group, 2020 Hogback Road, Ann Arbor, Mich. 48104.

DECEMBER 5-7, BOSTON — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

DECEMBER 5-7, WASHINGTON, D.C. — **Decision Support Systems on Personal Computers.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

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EDITORIAL

Managing productivity

Imagine, if you can, working days and evenings, with a few weekends thrown in for good measure, on a project that demands the utmost of your creativity and ingenuity.

The project becomes all consuming, as original deadlines, set months before, loom increasingly unrealistically. Unforeseen glitches render portions of your work unusable, while other portions need wholesale redoing. Meanwhile, your family begins to feel the strain of your chronic absence from home. Suddenly, nothing in your life is going right.

Then, as the project finally nears completion, your boss informs you that your labors will never bear fruit — the project is to be scrapped. What's more, you and the other members of the project development team must set to work immediately on a new design plan, whose future is no more guaranteed than that of the one just thrown out the window.

Sound familiar? It is, hauntingly so, to scores of programmers. And to add insult to injury, the programmers are often the objects of blame for wasteful development projects, when the real culprit, as often as not, is poor planning at a higher level.

That a certain number of software development projects will encounter cost overruns, massive delays and millions of dollars in misspent corporate resources is to be expected, given the nature of the work.

But what is disturbing is the apparent frequency of such wasteful endeavors — and their attendant costs. According to a recent survey of 200 Fortune 1,000 corporations (see page 14), one in four large system (64,000-plus lines of code) development projects now underway will be canceled. Three quarters of them will experience serious operational difficulties. The survey found further that a typical large system project today runs more than a year behind schedule and, if completed, will cost twice the original estimate.

These survey findings mirrored another recent study of programming in the corporate environment [CW, Nov. 12], a study that described programming as "labor intensive, difficult to manage, expensive and often leading to a product that is functionally deficient, unreliable and difficult to maintain." This study also labeled programmers as "not highly professional," and programming "more like a craft than a profession."

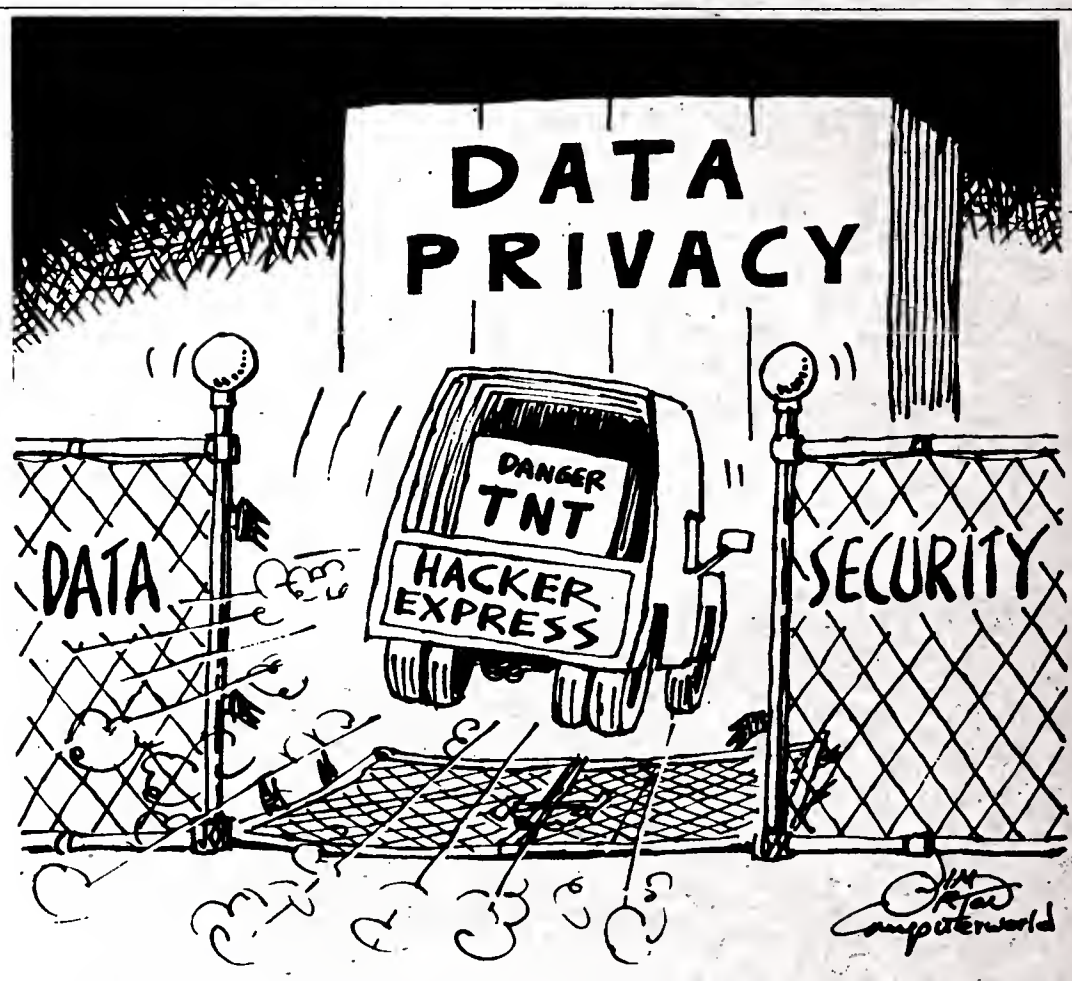
Alas, the poor programmers.They do what they are told with the tools given to them by management which hands them the project blueprint and says, "Now go and do it."

While the good news is that certain forces are at work mitigating the programmer productivity problem, DP management must heighten its awareness of what it can do to hasten the process.

■ *Hire the best.* The days of rampant programmer turnover have ended, for now anyway, so there's no good reason to hire relatively inexperienced programmers for complicated tasks. Let the newcomers cut their teeth on simpler tasks, or where they can be highly supervised.

■ *Take the lead in fostering software development methodologies designed to control costs and anticipate problems as early as possible in the development cycle.* This effort should be supported by serious testing of portions of the project early on.

■ *Wherever possible, develop libraries of reusable code.* While some argue that too much standardization in software development can stifle innovation, it appears most shops have a way to go before reaching this stage.



LETTER

A clear case for documentation

The article "Documentation: The Time-Saver" [CW, Nov. 5] is interesting, and it makes some important points. However, it should have mentioned something about the need to have documentation organized in a contemporary style.

This is the age of high tech, where information is transmitted quickly. But documentation writers are dishing out instructions as if their audiences were pounding on a Royal Underwood.

Procedures tend to be written without regard to format or readability. Often, instructional documentation contains related information that is not pertinent. To end users, it all comes across like alphabet soup. Then [the users] must waste time [sifting] through it, trying to find what appropriate action to take. Bits and pieces of related information are excessive noise and can be cross-referenced to another section — perhaps overview — or background. Presenting the important information first, in a quick, easy to read, logical order will [promote] fast, efficient performance.

Documentation has to be presented clearly and precisely. Instructions that are easy to read and follow will save time. If documentation layout is properly presented, it will lead to quicker comprehension and faster action. This may seem like an incidental matter, but it's this and the other incidentals that put food on the table.

Timothy J. Lahr
Spokane, Wash.

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VIEWPOINT

Managing the data center crisis



THE DATA CENTER
John P. Murray

An unfortunate situation that arises in data centers is associated with the introduction of new application systems or substantial changes to existing systems that degenerate into chaos.

The scenario is often the same. The new system is intended to provide substantial benefits to the organization, improve customer service and reduce costs.

For awhile, until the stress testing — if stress testing is used — or worse yet, the production stage is reached, all will appear to be going well.

But suddenly, the new system turns into a monster that threatens to destroy the data center operation and, in some cases, the entire organization.

Out of control

What now appears is a system that has consumed all available hardware resources. The system is out of control, has disrupted the entire work flow of the data center, destroyed the data center's client service levels and is creating an increasingly difficult situation.

Such situations do arise. They bring with them turmoil, finger pointing, unrest, anger and, eventually, senior management involvement on a rather intense level. Such situations can and should be avoided. Avoidance requires strong data center management, sound control and discipline.

Once into such a situation, it is common to attempt to fix, or avoid, blame for the current state of affairs. Often an attempt will be made to analyze the causes of the difficulty, to philosophize about "how we came to this."

These are exactly the wrong approaches at that time. Consideration of these aspects is appropriate, even necessary, but at some later date, not at the crisis time.

The key issue, once into a crisis, is to gain control, to stop the bleeding. Time and effort expended on anything other than containing and correcting the immediate crisis is simply wasted.

The key issue, once into a crisis, is to gain control, to stop the bleeding. Time and effort expended on anything other than containing and correcting the immediate crisis is simply wasted.

The tendency to panic, to resort quickly to whatever appears to offer some assistance, must also be avoided. The first step must be to make a calm, factual appraisal of the situation.

Ask yourself the following

Ask yourself the following questions. What specific programs are causing the problem? Are poor programs the only problem? Is the client and operations documentation also at fault? Are the system controls that are in place correct and adequate?

A common cause of difficulty in such a circumstance are untested or inadequately tested programs. These should be identified and an immediate effort mounted to correct those programs that are causing the difficulty.

The data center management must take a strong position in this effort. Changes to these programs must be carefully tested. They must work correctly and more effectively than those they are to replace, or they should be rejected.

It is often the case that the "nice person" syndrome is in effect in the data center. This often compounds the problem. Adopting a pattern of accepting untested, or not carefully tested, programs in an attempt to avoid hurting someone's feelings or creating conflict is not going to help anyone.

The goal of data center management in the case of an application system crisis must be, number one, to keep things from becoming worse, and number two, to build appropriate controls to move steadily toward making things better.

Swift and decisive action

Someone, obviously not the original project leader, should be selected to manage the way out of the crisis. That person should have absolute authority and control in order to be able to act swiftly and decisively. Clearly, this must be someone who is strong and not afraid to take the required action. Such action will likely bruise some egos.

This is particularly true if consultants have played a role in bringing the organization to such a state. Be that as it may, there is no time, given the circumstances, to consider anything other than the achievement of the required results.

These situations often have an insidious aspect. They seem to arise almost from nowhere, and in a very short time they reach disaster status. Data center management must work to develop appropriate controls that will effectively sound early warnings, which can be used to alert everyone to the potential for disaster. When those controls are in place, they must be relied upon and used by data center management.

Sound the alarm

Sounding the alarm does place the person raising the issue in an uncomfortable position, particularly in a situation where a great deal is riding on the new project and where considerable time and expense have been devoted to the project.

If outside assistance, such as consultants, is involved, the situation becomes more difficult, because these people will have a need to protect their positions.

However, the data center manager is remiss if, when it becomes clear that difficulty looms, nothing is done to correct the situation.

Crisis can be avoided. What is required is the ability to see it coming and the willingness to do whatever is required to correct the situation. Discipline, firmness and control are the watchwords in these situations.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Software fads: Costly waste or valuable resource?



HUMAN CONNECTION
Jack Stone

There is an unfortunate side effect from the heavy sales promotion of the new multifunctional superintegrated programs for personal computers in the corporate arena — also known as Lotus Development Corp.'s Symphony and Framework — that is becoming chronic.

Such marketing efforts inadvertently, but inevitably lead to the creation of yet another fad, and the subsequent forcing of one more instance of what I term the "maelstrom effect" on the part of the personal-computer-obsessed users, especially managers and executives. This situation evolves when users, however guileless, are swept up into a whirlpool of enthusiasm for the latest and greatest personal computer technology, virtually irrespective of knowledge or need, fervently believing that without it, they will not reach the quintessential zenith of their productivity potential. This results in a soaring demand for expensive software — one copy per system if the license specifications are adhered to — and more personal computer power including hardware add-ons, training and ongoing systems support. The end results? In a number of cases, dollars are wasted and, even more important, the efforts of scarce technical talent are dribbled away in providing ongoing support.

Now then, along with everybody else in the business, I am a devout believer in the expanding of computing capability when the need exists. But when the costs in terms of systems outlay and follow-on support become extravagantly large relative to computing gains, then the procurement brakes should be applied and the maelstrom attenuated until saner heads can prevail.

The good old days

Let's take a look at a few numbers to make the point. We will first harken back to those good old personal computer days of yesteryear, days of 64K bytes of random-access memory (RAM) and twin 160K-byte floppy disk drives — which, lest we forget, continue to do a journeyman's job for a very large population of users. The move into the realm of Lotus' 1-2-3, for example, typically requires an upgrade to 256K-byte RAM (or equivalent RAM/read-only memory combinations) plus twin 320K-byte drives. Add up the cost of software and hardware increments, and one is staring at a bill of around $1,000 per system. If we toss in the extras of training and ongoing systems support, something on the order of a $2,000 investment per single-user machine — double the hardware/software costs — is not overstating the situation. Now, if we take as a model an organization with a hundred machines installed — all candidates for upgrading — the final tally approaches a ballpark estimate of $200,000.

Now let's start with that number as a base, and take a look at the Symphony upgrade. One can perhaps sneak by with a 512K-byte RAM and the same disk drives, but I don't think that configuration is realistic, and even if it were implemented, I think that users would shortly come back to the negotiating table, demanding 640K-byte RAM and a hard disk. This latter upgrade plus software comes in at about $2,000 per machine, and, if we add in the same amount as above for training and support, we arrive at a rough estimate of a $4,000 investment per single-user machine. For the hundred-machine organization, the price tag for the upgrade from Lotus's 1-2-3 to Symphony is a whopping $400,000.

I am not suggesting that the superintegrated programs are not of great utility for business users. What I am saying is that decision makers have to discriminate legitimate need from opportunistic fadism before committing a company — and its hard-earned cash reserves — to an applications programming system of this complexity and expense. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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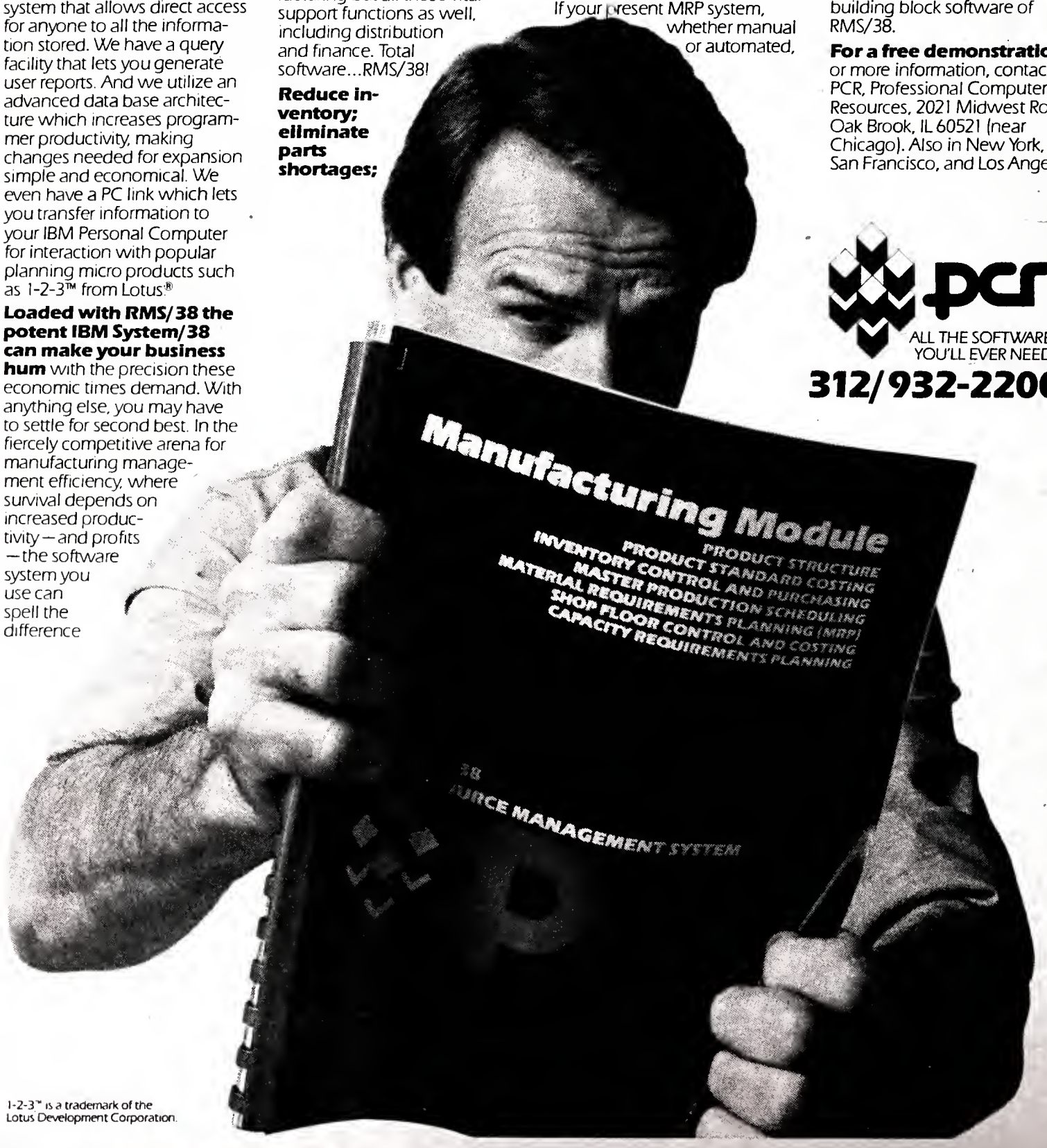
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VIEWPOINT

Micro standards in, innovation out

READER'S PLATFORM
Ira H. Krakow

The era of standard microcomputer hardware and software has arrived. Hardware and software selection has been reduced to the ritual of brand name recognition. Vendors have concentrated on high-budget advertising and slick packaging, instead of on product quality and user needs. The result is that today an innovative product without a multimillion dollar marketing budget is doomed to failure. A mediocre product with a multimillion dollar budget may succeed if the competition is not IBM or AT&T, both of which sport multibillion dollar budgets.

Suppose you've been given a four-month project of recommending microcomputer hardware and software for your company. Your boss has told you to determine user requirements, research the market for the latest products and perform a cost-benefit study to determine which configuration is best. Do you need to do all this? No. Do the following:

■ Spend an hour browsing through any of 100 computer magazines. Be sure the paper is sufficiently glossy and the cover story is something like "Morticians Use Micros to Cut Embalming Costs." Try to read an article. Note that the first page (which consists of one column of the article and three columns of advertising copy), is followed by 15 pages of advertisements.

■ Strike up a conversation at the water cooler with secretaries. Ask them what the label on the word processor says.

■ Your research done, pick from this list of products:

Microcomputer. Anything with the IBM Personal Computer logo on it.

Disk drives. Get a 10M-byte hard disk. If your budget allows, any multiple of 10M bytes will fill the bill.

Memory. Pick a number — divisible by 64 — between 256 and 640.

Integrated spreadsheet. Buy Lotus Development Corp.'s 1-2-3.

Database management software. Ashton-Tate's Dbase III should do.

Word processing package. If a secretary said Wang in response to your question, choose Multimate. Otherwise, choose Wordstar.

■ Take a well-deserved four-month vacation in the Bahamas.

This scenario, while tongue-in-cheek, is uncomfortably close to the truth. The much-publicized shakeout in the microcomputer industry has affected all of its components. There is a glut not only of IBM [Personal Computer-compatible] computers, but also of spreadsheets, data base management systems, word processing packages, diskette drives, hard disks, add-on boards, computer books and magazines.

The result of this glut and uncertainty has been a retreat to brand name loyalty and a low tolerance for new ideas. This is understandable. A product that has been around for a while and has a substantial user base is probably relatively bug-free. The vendor (particularly if it's IBM) stands a better chance of sticking around.

Even well-established vendors with big advertising budgets, such as Lotus and Ashton-Tate, have had problems convincing the marketplace to accept the idea of all-in-one integrated software, as embodied in Symphony and Framework.

What chance does an innovative microcomputer product have nowadays? Regrettably, a very small one. Microcomputer standardization has become a barrier to creativity. ‡

Krakow is a Stoneham, Mass.-based independent microcomputer software consultant and the author of Lotus 1-2-3 Self-Taught for the IBM PC *and* Managing Projects Using the IBM PC.

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IN DEPTH

Support Systems For the Executive

A Look at Five Installations

Research for this article on executive support systems comes from two sources: case studies documenting the implementation of executive support systems in five firms during a two-year period; and the regular monitoring of executive support activity in 20 firms. The majority of the systems were studied from planning phase through implementation.

Following is a description of the five firms studied in depth. Their names are disguised.

Manuco is a multinational manufacturing organization with stable leadership. The company has been hurt severely in recent years by foreign competition and the need to modernize production processes.

Executive support was called for by the chairman, who felt that every group head should demonstrate the use of technology as an example for his organization. Responsibility for developing and executing the support system was given to the MIS organization.

The system consisted of a pilot program involving 18 executives and their secretaries, all of whom were provided with word processing, spreadsheet and communications tools. At the end of one year, the pilot program ended, and some of the executives returned their terminals.

Wellness is a manufacturing and distribution organization that had suffered a loss in profitability and market share. The support system was called for by the new chief executive officer, who was attempting to make the company more analysis- and marketing-oriented. At the end of two years, the system had expanded from use by eight executives to affect significantly the work of product managers and analysts.

There are currently two subsystems of the executive support system: one for the marketing organization and one for sales. Significant changes have occurred in the product mix, organizational structure, incentive system and middle-management work along with implementation of the support system. Currently, there is concentration on a training program for managers and the reorganization of the data base.

Smokestack is a basic manufacturing organization that suffered large losses and was nearing collapse. The support system was called for by the new chairman, who was looking for a system to help him identify areas for cost control. Responsibility for the system went to the chief financial officer. During the last two years, several attempts at limited executive support have been made, including a personnel system, an acquisition model, a management reporting system and a price model.

Currently, the chief financial officer is establishing a budgeting model to be used by the five senior managers in making allocation decisions. There has been an improvement in the financial position of the firm. Several reorganizations, personnel changes and divestitures took place.

International Products is a consumer products company responsible for producing, marketing and selling personal care products. The company earned a long-established market share and continues as a leader in its industry. The support system was called for by the new chief executive officer, who was looking for a way to present complex data simply and wanted to identify changes in the firm's markets and bring divisions into line with the group's strategic plan. The comptroller assumed responsibility for the executive support system; initial users included the chief executive and the comptroller.

After two-and-a-half years, the system has moved down to the divisional presidents and to the financial staff. The system's range of applications has expanded to include all of the financial and much nonfinancial data. Executive support also diffused to other groups within the company.

Toy Electric is the research and development group of a consumer electronics company that was undergoing a change in organizational structure. The chairman of Toy Electric called for an executive support system to distribute communications and personal management tools among the 30 vice-presidents of the firm.

Implementation of the support system was delegated to the MIS department for initial installation, which involved 15 vice-presidents and their secretaries. The project doubled in size after the first year. At the end of the second year, the pilot project was terminated.

By Eliot Levinson

Executive support systems are currently the high fashion for senior managers. This article describes the realities of development and impact of executive support systems in five large firms. The focus is on five key elements that must be managed for these systems to be effective:

1) A business problem or vision that defines the purpose of the system.

2) Sponsorship by a senior executive.

3) The organization of MIS computing groups as effective support organizations that translate managerial needs into technical systems.

4) A well-defined, accessible data base.

5) Resistance as the new systems change established procedures and reporting relationships.

Companies initiate executive support systems for three reasons: to solve a business problem, to make executives more efficient or to signal to the organization that technology should be employed. A distinct difference in development and use exists between use of an executive support system in firms where it is initiated as a problem-solving tool and firms where it is brought in for other reasons.

The problem-solving systems begin small in number of applications and number of users and then grow. They gradually evolve into planning systems. The efficiency systems begin with a larger number of users and atrophy. At the end of two years, only the problem-initiated systems survived. Distinction between the two types of systems is the relationship of the executive support system to the core of the business.

The business problem is most important during the early stage of system development. Two of the systems in this discussion were established as crisis responses by new chief executives, who were looking to the new technology for an effective solution to serious problems.

Smokestack was losing $250 million a year, and the chairman asked for a system that would allow him to control costs.

At Wellness, sales had decreased substantially, and the CEO wanted a data base that would allow him to shift the company to an analytic marketing orientation.

At International, the division head knew that unless the company could come up with a clear strategic plan and find better ways of communicating financial information, it was headed for hard times. He looked to executive support systems as a possible way of averting serious problems.

Clear expectations of the system's capabilities and benefits to the firm by the executive sponsor play an important role in its early development and ultimate utility. At Wellness and International, the sponsors defined their problem or organizational vision clearly and manageably so these issues were addressed. In both cases, a "critical success factors" process was used with a small group of top managers to clarify goals and specify the type of information executives needed. This process also served to establish a sense of mission within the organization.

At Smokestack, the function of the support system was initially more ambiguous. The early prototype focused on cost problems, but there was no clear direction because several other problems were apparent at the same time. It was not until two years and three pilots later, when executive support focused around the budgeting process, that the system began to function.

At Manuco and Toy, the executive support system was not linked to business problems. Although Manuco had several long-standing business issues caused by its competitive situation, these were not employed as a catalyst for the executive support system. The only expectation set by the chairman of Manuco was that senior executives should experiment with information technology and provide an example for people below them in their organization to use it. At Toy, the president wanted a machine for the 30 vice-presidents and their secretaries that would help them communicate and manage their time better. In comparison with the effectiveness systems, the initial expectations of these systems were low, as they supported tasks peripheral to the core needs of the business.

Installation phase

As implementation evolves through and beyond the installation period, the original business problem is not as important as in the organizational phase. During the installation phase at Wellness, the support system evolved to include more applications and become useful at lower levels in the organization. The focus of the system moved from present problems to planning of future products, and a component for the sales organization was added. At International, several financial, competitive and nonfinancial data bases were added to the initial support system, and the executives of the divisions were put on the system.

Initially, executives use the support system to retrieve the management reports they used to receive in hard copy. As the support systems evolve and their staffs develop competence in using decision support tools, the systems are increasingly used for "what-if" queries and scenario building.

At Smokestack, the evolutionary design was subject to trial and error. Since the initial goals of the executive support systems were ambiguous, a series of support systems were developed for various executives, including an executive personnel system, a pricing model, a management reporting system and a plastics division model. None of these systems was totally successful, and they reflected the chairman's lack of precision in his initial call for executive support. They did, however, serve to expose senior executives to some of the possibilities of information technology.

The approach to executive support systems at Manuco and Toy during the installation phase could be termed the "portfolio approach." The information systems departments provided a range of applications such as electronic mail, calendars, word processing, spreadsheets, automatic dialing and corporate reports. The rationale was that with a wide choice of applications, the executives would find something useful. At both firms, a significant number of executives utilized electronic mail, though a lack of participation on the mail system at Toy limited its use. Over time, use of the communications tools diminished, and only a small number of people used them.

The difficulty of implementing the efficiency systems can be attributed to the fact that senior executives have satisfactory support in the form of executive secretaries and assistants, and subordinates respond to their demands quickly. On the other hand, business-problem-based systems provide value-added information about a core concern of the business.

Institutionalization phase

During the institutionalization phase, the *raison d'etre* for executive support systems shifts from a business crisis to a combination of monitoring business health and looking toward the future.

At International, the president has used the executive support systems in assessing new ventures as a way of avoiding the decline of old products. At Wellness, the executive support system is being used to make decisions about new product development.

Another aspect of executive support in the institutionalization period is its linkage to core organizational processes. At Smokestack, it is utilized in the budgeting process, at International in strategic planning and at Wellness in marketing and sales. It is interesting to note that those executive support systems that were not institutionalized were not linked to any core business function.

Sponsorship is the initiative role the senior executive plays in the design, development and use of support systems. The executive's participation makes more of a mark on the implementation of executive support systems than on any other element in the initiation and execution of executive support. The sponsor's functions include:

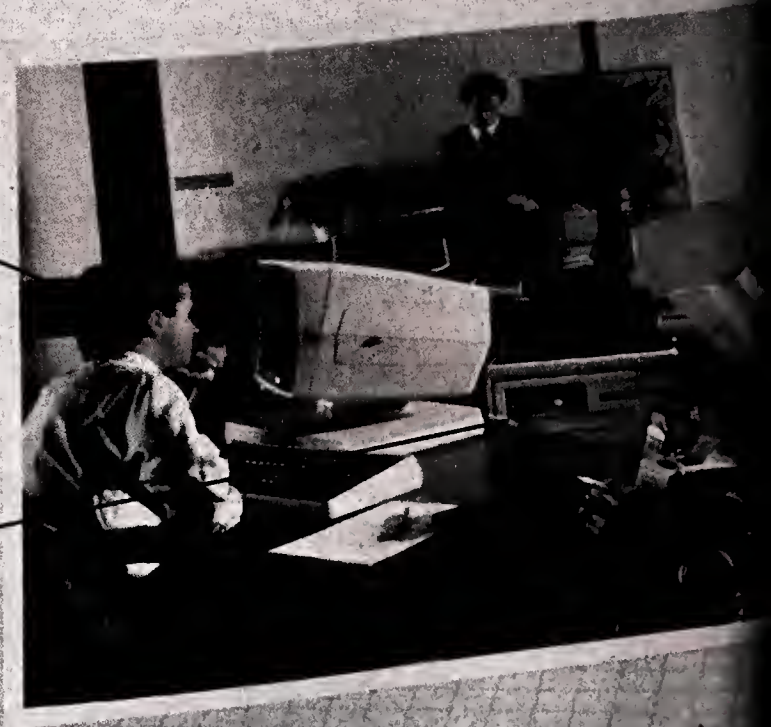
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■ Initiating the demand for executive support systems.
■ Establishing an organization to implement them.
■ Defining the purpose.
■ Developing usage.
■ Utilizing outputs.
■ Moving the systems through the organization.

In the firms we researched and worked with, there have been a variety of patterns of sponsorship that include executives who view executive support systems as an essential management tool and those who see them as peripheral.

There are executives who participate in the design, development and evolution of the system, while others delegate it to the information systems department. There are those who define the purpose of the system very early, while others discover its utility during implementation.

After saying, "I want one," the next step was defining what "it" was. At this stage, there was a variety of responses by the sponsors.

The sponsorship role changes during the life of the support system. Initially, the titular sponsor, that executive who called for the system, is most important. As time moves on, an operating sponsor, the person delegated to manage the installation and diffusion of the system, becomes most important.

Organizational phase

The titular sponsor's motivation to call for executive support systems is spawned by two situations: the combination of a crisis he wants to solve and being new to the job; or a desire to have executives utilize computer technology as part of their daily work.

The titular sponsors in this study were divided into two categories. Those who called for effectiveness systems were all new to their jobs. They were looking for information to aid them in the solution of some problem, to provide a quick understanding of how the organization functioned and to bring about organizational change. The sponsors who called for efficiency systems had been in their jobs longer and were motivated by a generalized desire to have other senior executives demonstrate modernity and work more efficiently by using technology.

After saying, "I want one," the next step was defining what "it" was. At this stage, there was a variety of responses by the sponsors. At Wellness, there was a problem-solution support system match. The CEO and his top managers went through a critical success factors process and defined the information needed to analyze their markets, assess performance of their products and link the two to their sales territories. This exercise articulated a clear vision of where the management team was heading in aiming at high-profit margin items.

At Smokestack, the chairman and the head of decision support utilized a similar problem-solution match to develop a prototype system for cost control, but no other executives were involved. At International, the "discover as you implement" approach was used in defining the system. The comptroller, who had been developing accounts receivable and forecasting applications, and the new CEO, who was trying to find a way to communicate financial information easily, requested that a computer graphics system be linked with the data base.

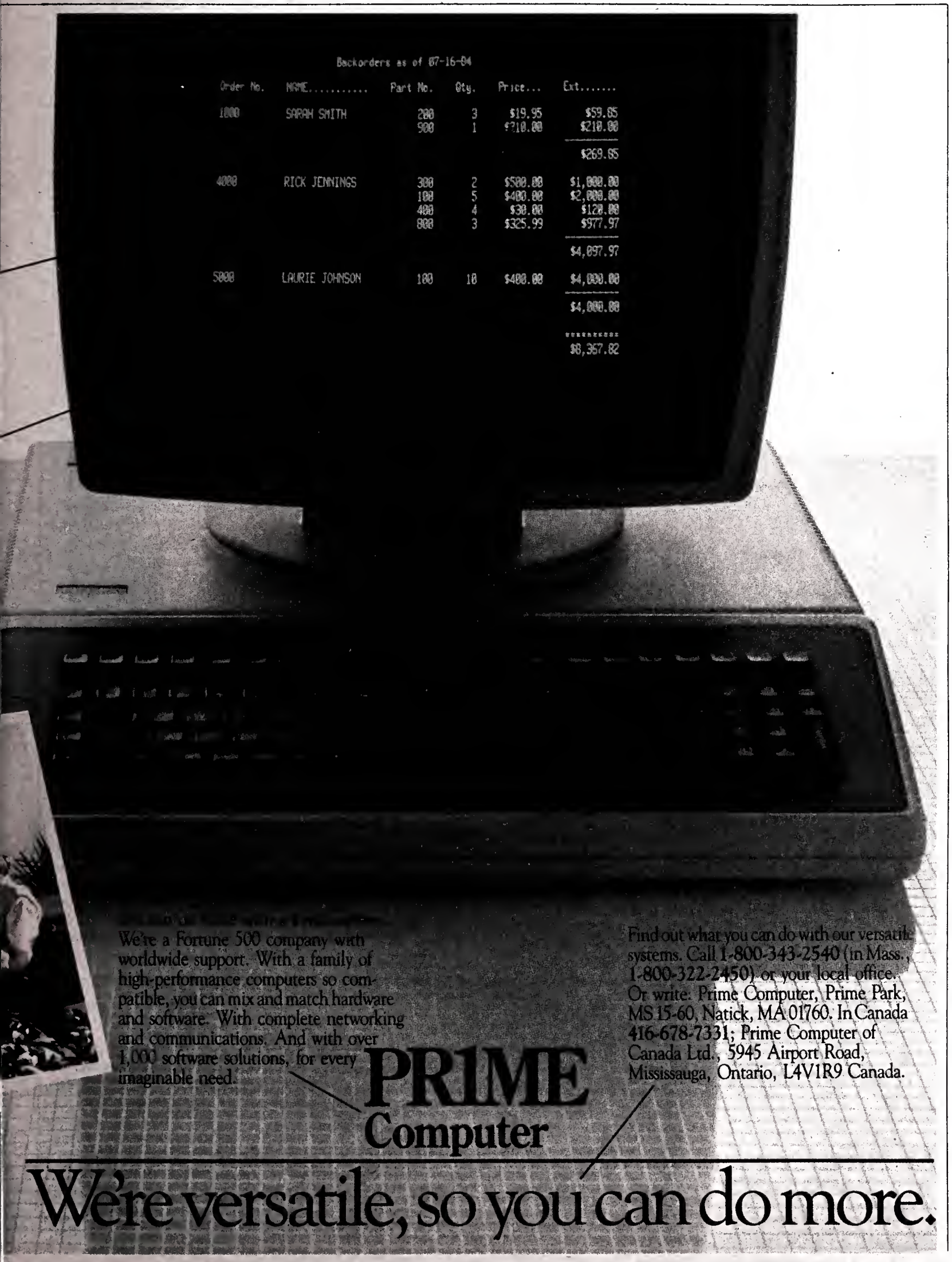
At Manuco and Toy, the CEOs defined the support systems through delegation. At Manuco, the chairman stated that he wanted a computer on every group executive's desk, symbolizing to the rest of the organization that senior management was using technology. He then delegated sponsorship of the project to the information systems organization.

At Toy, the president asked an engineering group and then the MIS group to find a communications tool for senior executives that would combine a telephone and computer tools to help them with their management. In both cases, the titular sponsor saw the support system as technical support and delegated its definition to technical organizations. This approach was in sharp contrast to the other three firms where the titular sponsors saw the systems as management tools and involved themselves and other executives in defining the systems.

Operating sponsorship

The role of sponsorship shifts from the titular sponsor to the operating sponsor as the task changes from envisioning the support system to installing it and evolving its usage within the organization.

The role of operating sponsorship is best demonstrated by its absence. At Smokestack, the chairman delegated installation of the project to the chief financial officer, who resigned, and then to another vice-president, who was not interested in the system. During this 15-month hiatus, the computing group initiated a series of less than successful support systems for division heads and various vice-presidents. A new chief financial officer was appointed who implemented a management reporting system for the group vice-presidents that had been stalled by his predecessor, and then the computing group, under the auspices of the chief financial officer, developed a model to be used by all groups in the budget process.



Sophisticated knowledge of computer technology was not necessary for effective use of the support system by senior executives. The systems incorporated menus, touch screens and fourth-generation languages.

This model allowed the chairman and chief financial officer to look at the relationships of the various groups as a value-added chain, something they had previously been unable to do. The budgeting model is becoming the executive support system as it allows senior management to look at individual businesses and their relationship to each other, which is the current central problem of the firm.

The comptroller at International represents a good example of operating sponsorship. He acted as the gatekeeper between the computing group and the president, made decisions regarding applications development, linked the support system to the strategic planning process and executed all of the applications so they were usable by other executives. As his primary contribution, the comptroller directed the financial analysts in learning to develop and utilize the executive support systems. He was also instrumental in diffusing executive support systems usage downward into the various divisions of the group.

Sophisticated knowledge of computer technology was not a necessary condition for effective use of the support system by senior executives. The executive support systems were very easy to use, with such features as menus, touch screens and fourth-generation languages.

During the installation phase, the executives learned to utilize the technology, usually beginning with retrieval of the standard reports they had received in hard copy. When more demanding tasks, such as querying and modeling, were needed, the executive had the system chauffeur-driven by one of his staff. The CEOs at Wellness and International both stated that executive support systems gave them an understanding of the dynamics of their businesses they had never had prior to the systems' installation.

Directors to users

During the institutionalization phase of executive support systems, the sponsors became more users of the system's output and less directors of its development. By demanding a coherent set of information within an easily accessible, defined framework, these sponsors had driven the organizations under them to hire and train managers with computer skills who spent a significant part of their time inputting data for the system. At both Wellness and International, line managers and staff analysts adapted their work to the support system.

During the institutionalization period, there are two processes that occur: the executive support system is diffused to other parts of the organization where new sponsors must adapt them to their needs; middle management has to fit analyses and reports into the framework of the support system in answering requests of superiors.

The importance of new sponsorship can be seen at International. The MIS group disseminated the tools developed in the original division to another group. The group executive did not perceive the financial management tools as linked to his job, so what had been an executive support system became a middle-management efficiency tool, helping the financial analysts in the new group to get their work done faster.

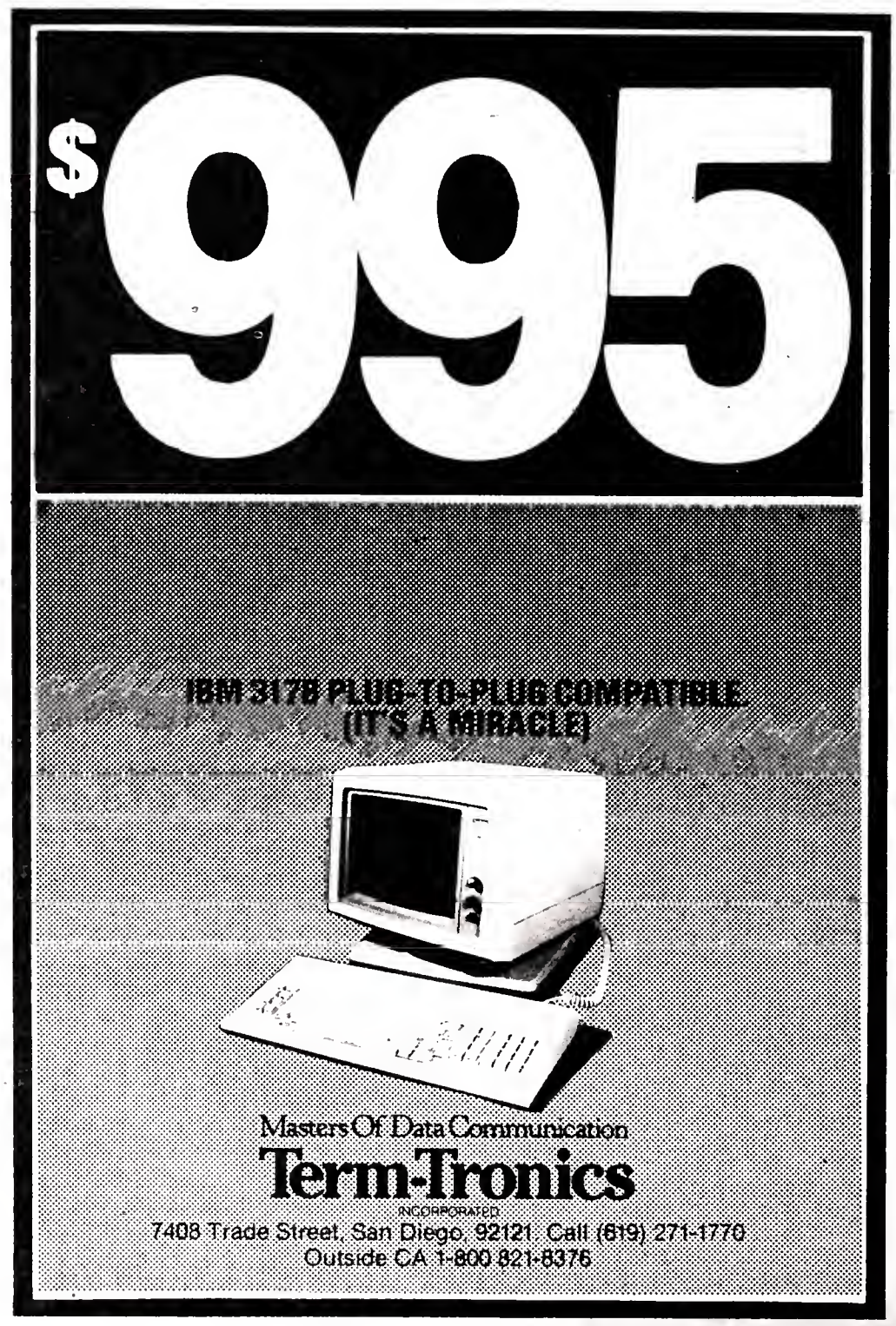
At Wellness, and in the original group at International, the division heads and middle managers were highly affected by the executive support systems. The systems imposed a discipline on the types of questions senior executives asked of their subordinates, which in turn demanded that middle managers utilize computer-based skills and begin thinking in the framework of the executive support systems.

In the three firms where problem-oriented executive support systems were established, the middle managers perceived their advancement as linked to their ability to utilize decision support tools.

End-user tools

Executive support systems are end-user computing tools. The sponsor plays the key role in defining the use of the system so that it is used as a management tool.

There were two patterns of sponsorship that delineated whether the executive support system was ultimately useful as a management tool. One group of sponsors, exemplified by either the titular or operating sponsor in the effectiveness groups, saw the executive support system as an extension of themselves and participated actively in its design and



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the establishment of an organization to implement and manage it. Systems implemented under these sponsors reached full implementation. The other group delegated the design of the system to others, giving the message that it saw executive support systems as technical support rather than as a management tool.

There are two constructs that should be considered in understanding sponsorship. The first is that business crises or visions create effective sponsorship; the second is that some executives, the *co-opters*, view the technology as a valuable phenomenon that must be turned to their advantage, while others, the *victims*, do not understand it and therefore manage it by delegating it to technical groups and do not involve themselves in the process of implementation.

Computing groups

The role of computing groups is central to executive support systems throughout the life cycle of implementation. The structure of the group, its relationship to management and the approaches it uses in developing the support system at different stages of evolution significantly impact the effectiveness of the support system.

Executive support systems present MIS with the extremes of the problems and opportunities associated with end-user computing. The perceived power differential between general managers and MIS staff, combined with the differences in the nature of managerial and technical work, affect the process of defining and implementing easy-to-use but complex support systems.

In the various approaches that MIS or management take, there are three key factors to be controlled that affect implementation: problem definition, the type of executive support system presented as the solution to the problem and the organizational sponsorship. When all three factors are addressed, as in the case of management-generated support systems to solve a defined problem, the implementation process will move most effectively to meet expectations. When these expectations are not well defined, the executive support system is less likely to be effective.

There are three types of information systems organizations associated with executive support systems: the data processing group, the segmented group and the integrated group. The data processing group includes the data center, office automation, decision support systems and development. The segmented group is made up of DP, systems development and end-user computing. The integrated managerial group would typically consist of end-user management and end-user computing.

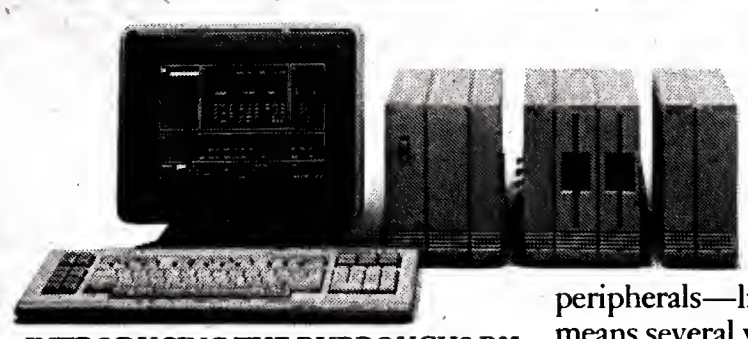
The DP group differs little from the groups that constructed transaction processing systems a decade ago, but they have since absorbed new technologies, including office automation and decision support. The DP groups approached executive support systems as a traditional systems development effort. These groups were staffed by people with strong technical backgrounds who had a product orientation. They took full delegated control of the projects rather than sharing decision making with management and placed major emphasis on the development of hardware. The DP groups concentrated their effort more on the early phases of the project rather than on installation.

In the segmented MIS organization, the end-user computing function is autonomous: Data processing is handled by one group, systems development by a second and user-controlled technologies by a third.

End-user computing groups differ from traditional DP groups in several respects:

- They are service rather than product-oriented. Their role is to help the end user accomplish his aims and establish the most appropriate hardware and software environments in which to do this. They do not "control" the system. From the outset, it is clear that decisions concerning use of the system come from the end user. In two of our cases, it was decided prior to beginning work to build a turnkey system for the end user.
- End-user computing groups are staffed by people with a business background, or project teams are set up to include end-user management.





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THE QUESTION ISN'T WHO'S BIGGER.
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At the manufacturing firm, executive support was given to an engineering group within the management systems organization, which then developed technical specifications for personal computers to be used by executives.

■ End-user groups use an evolutionary design process that starts with a prototype and adds applications incrementally, as opposed to the traditional DP process of developing the system fully before usage.

The integrated MIS groups report directly to management as members of the executive's staff and have only a "dotted-line" relationship to the MIS organization. None of the groups we studied started as integrated groups, but they evolved that way as implementation of the executive support systems progressed.

The staff within the integrated group is more managerial than technical in background and demonstrates consulting skills. However, they have a strong background in computer tools. They view information technology as the tool to accomplish a primary business task, such as financial planning or marketing.

The differences and similarities between the groups can be seen in their definition of and approaches to implementing executive support systems at different stages of development.

Determining need

The main task in the early stages of executive support systems is defining the problem to be worked with and choosing appropriate hardware and software. At Wellness, the end-user computing group interviewed several subsidiary presidents to find a situation where an executive support system would meet a need. The group found a subsidiary where the new CEO was looking for a tool to change the focus of the company from sales to marketing.

Critical success factor interviews were conducted among the four senior executives to determine what information was needed and then a prototype of the marketing support system was developed. At this point, Wellness committed the funding for the project and management, jointly with the end-user computing group, chose Express as the language for the executive support systems. A member of the end-user computing staff was assigned at Wellness.

In contrast to Wellness, at Manuco, executive support was given to an engineering group within the management systems organization, which then developed technical specifications for personal computers to be used by executives. The project was then given to a newly formed marketing group within the information systems group, which developed applications for an executive workstation. After the hardware had been ordered, the marketing group interviewed the 18 executives and their secretaries who were designated as users. Unfortunately, they found out in the interviews that the hardware did not meet the work requirements of the executives.

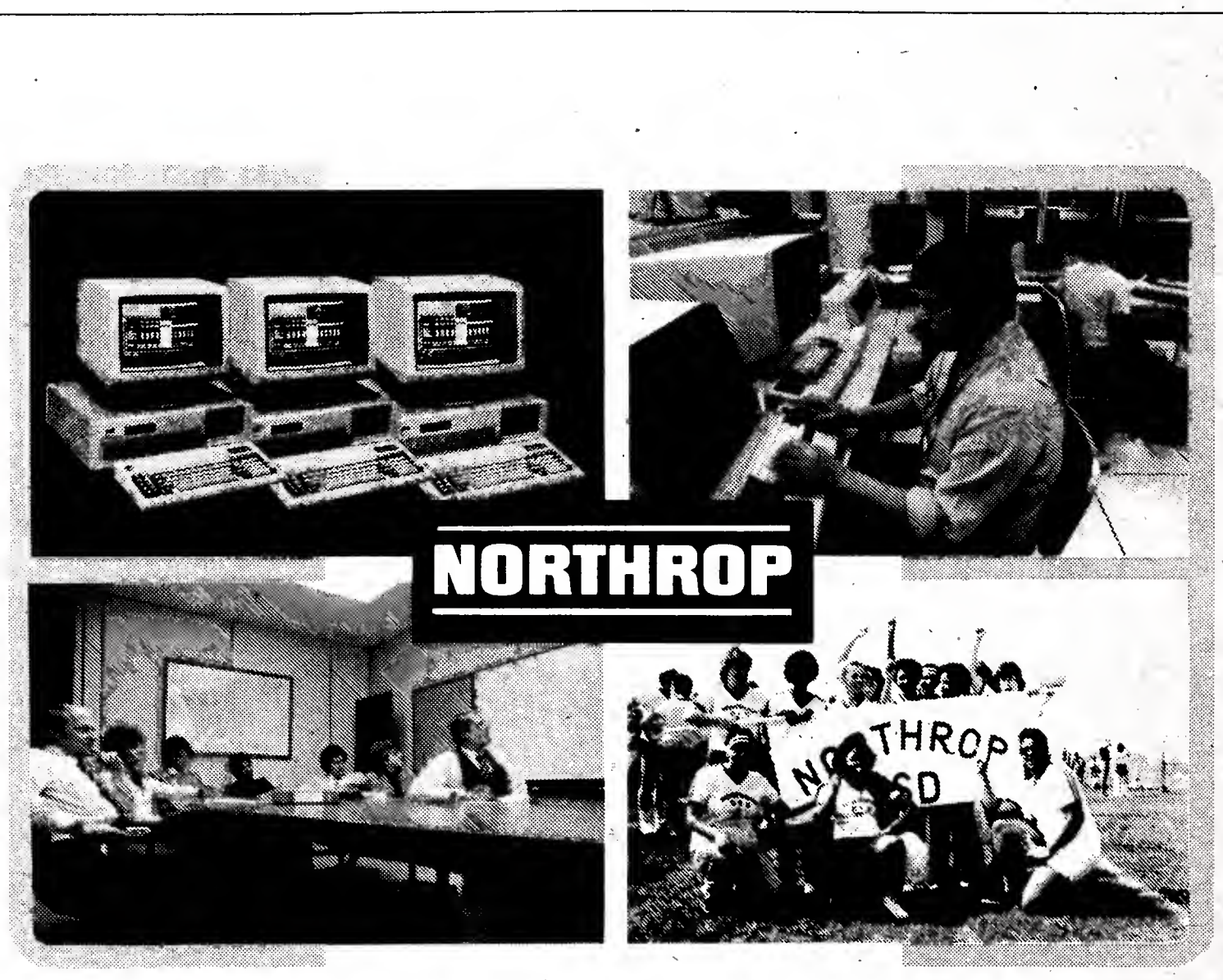
The main differences between the approaches of the DP groups and the end-user organizations were as follows:

■ DP groups emphasized hardware, whereas the end-user organizations concentrated on problem definition and software.

■ The DP groups were delegated or took control of the project, whereas the end-user groups shared decision making on the nature of the support system with line management.

Installation phase

In the installation stage, the task of the computing groups is to get the system functioning and work through start-up problems,



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The software picture

There are three categories of software used in executive support systems. The majority of executive support systems are custom-tailored, built from general-purpose decision support languages. The common software used for these systems are:

Management Decision Systems, Inc.'s Express; Information Builders, Inc.'s Focus; Mathematica Products Group, Inc.'s Ramis and Boeing Computer Services Co.'s EIS.

In the majority of firms with which we have worked, the company places considerable emphasis on choosing the language and then builds its own system.

Category II — Executive support systems. There are now specialized systems for executive support that are targeted at senior executives and are distinguished from the generic systems in their visual emphasis.

Category III — Communications and management support.

Digital Equipment Corp.'s All-In-One comes under this group. IBM's Professional Office System and Computer Corp. of America's Comet 204 are used more by middle and lower-level managers for general managerial support. However, these systems are used by senior executives for electronic mail and communications.

modifying the system so it is a real utility to the users.

International presents a typical example of where an end-user computing group worked on a parity basis with management, supplying half the manpower to teams developing different applications. After developing a prototype of a financial data base with a financial analyst, the computing staff went on to develop a nonfinancial data base, an accounts receivable package and a competitive data base. They also helped select a graphics package, but their choice for graphics was not the one finally picked by International's management. The computing group at International combined a strategy of evolutionary design with participative decision making by the management group.

In contrast to International, the computing groups at Manuco and Toy were delegated more responsibility, but they had less authority over the installation of the executive support systems. To cope with the ambiguity, the groups used a portfolio approach to the project. At Manuco, the MIS group decided that executives and their secretaries would use word processing, calendaring, electronic mail, document transfer, the Dow Jones & Co. News & Retrieval Service, corporate reports and spreadsheets. They put all these applications on very easy-to-use menus and provided individual training to all the executives and secretaries involved.

Their rationale was that out of the sumptuous buffet of software, the executives would choose something. Although secretaries did use the system, only four executives used it regularly and the computing group was unable to get access to the executives to train them — or to divisional data that might have been of assistance to the executives.

Another aspect of the DP group's approach was an emphasis on the computer interface. At Toy, the hardware, which was a combination of telephone and computer, took only an hour to learn to use, and at Manuco, considerable effort went toward establishing one-button access to any application faced with low usage. As a solution, the computing groups continued to expand the portfolio and the number of installations.

With both the end user and DP groups, emphasis was placed on user training during the installation phase. At International and Wellness, the computing group saw its function as developing expertise within the executive staff, and at Manuco and Toy the emphasis was placed on user-seductive software that could be of immediate utility to the executive.

At Smokestack, an effort was made to provide executives with easy-to-use management reports. The training efforts were more successful when aimed at staff people rather than at the executives themselves.

During the institutionalization phase of implementation, the tasks for the computing groups are to disseminate the system either downward, so it diffuses within the

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organization, or across other divisions and to establish a standardized environment for operation of the system.

The efficiency-oriented communications systems ceased to exist after the installation phase. At Manuco and Toy, the support systems had been labeled as pilots, and both firms declared victory and ceased operation. At the other three firms, the support systems became embedded within the organization.

In all three firms, the computing groups moved toward being more integrated into the user organization. At Smokestack, the computing group moved from de facto reporting to MIS to reporting to the chief financial officer. At International, the comptroller's staff took over operation of the support system, and the computing group disseminated the applications to four other divisions. At Wellness, the computing organization lost its reporting independence from MIS but became fully integrated within subsidiary management.

At both Wellness and International, the support system affected the jobs of middle managers and analysts within the organization, and training programs were established to provide these managers with the necessary skills in use and growth of the technology. At Wellness, the increase in breadth and depth of the system necessitated a reconstruction of the data base, and that job was given to the computing group.

At Smokestack, the integration occurred around a central corporate-wide budgeting process. The computing group, as delegate for the chief financial officer, developed a budgeting model that affected all groups in the corporation. The computing group is currently in the process of training the various financial staffs in use of the tool.

In summary, the computing group is an important factor in executive support, since it affects the implementation at all stages and has considerable daily contact with the nuts and bolts of the system. The role of the computing group changes during the process of implementation from problem definer to implementer to maintainer and diffuser of systems. The computing groups that were most successful appear to have shared decision making more with management than those who were delegated more responsibility for the implementation.

The discussion of computing groups as a factor illustrates the problem of separating factors. It is obvious that the kinds of management sponsorship and problem definition greatly affect the role of the computing group. It is no coincidence that computing groups were more effective when business problems catalyzed initiation of the system and managerial sponsorship was active. However, the ability of computing groups to capitalize on those opportunities depends on their structure and skills.

The existence, usability and development of data bases were major factors in building executive support systems. Existing data bases were a necessary but not sufficient condition for the installation stage of the effectiveness-oriented systems and became important again in the institutionalization phase. The preexistence of a community of users is as necessary a condition for communications-oriented support systems as data bases are for business problem-based systems, because being accustomed to the technology speeds the implementation process.

The existence of data bases and a community of users demonstrates a seeding of technology within the firm that prepares it for the growth of support systems. During the last phase of implementation, data bases become important as diffusion of executive support systems from one division to others and to the corporate office demands the creation of a data warehouse and the establishment of common conventions surrounding data management.

Business problem-based executive support systems demand the presence of information on which alternative scenarios for decisions can be made against past performance, and categories of information may be compared with each other. In two of the firms we studied, Wellness and International, the use of information technology was well developed. Managers had apparently been exposed to information technology, and historical data bases on matters central to the firm were usable.

In contrast, information systems had been given very low priority at Smokestack prior to the arrival of the new management. At the beginning of the implementation process, the computing group found that all financial accounting had been decentralized to the subsidiaries, rendering financial data incomparable. The centralization of accounting practices and the development of a common general ledger system were necessary before financial data could be developed for an executive support system.

The development of these systems took 18 months and made the initial concept of a cost-control executive



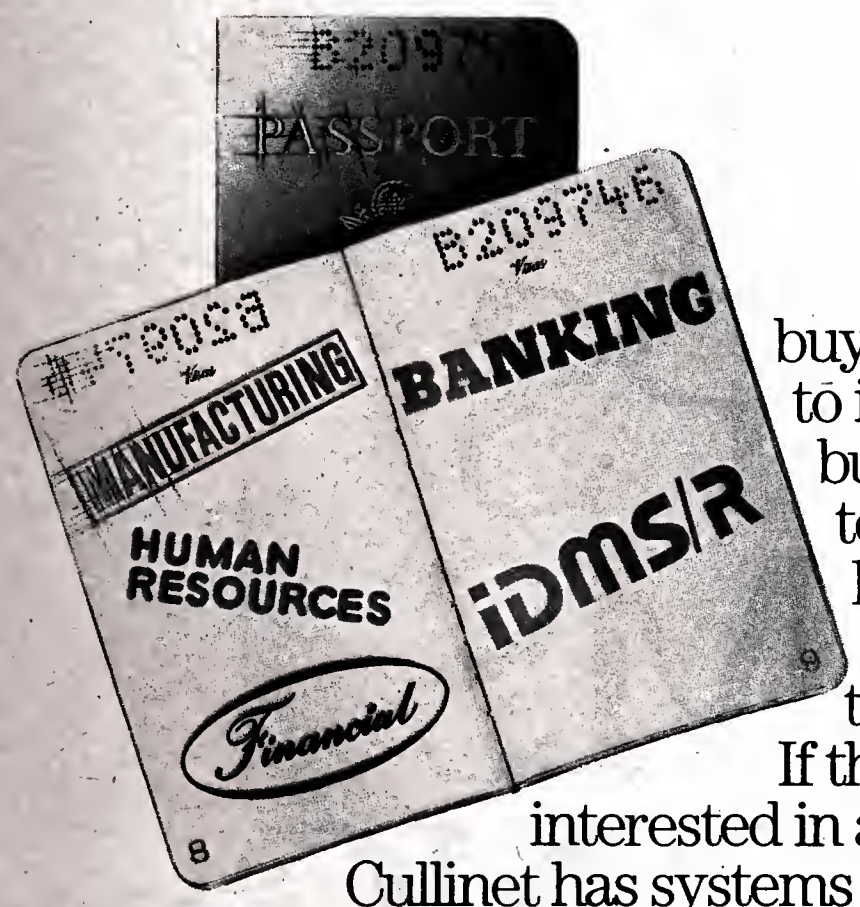
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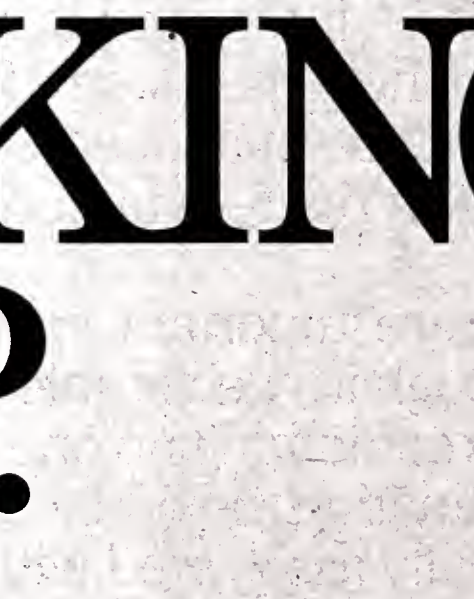
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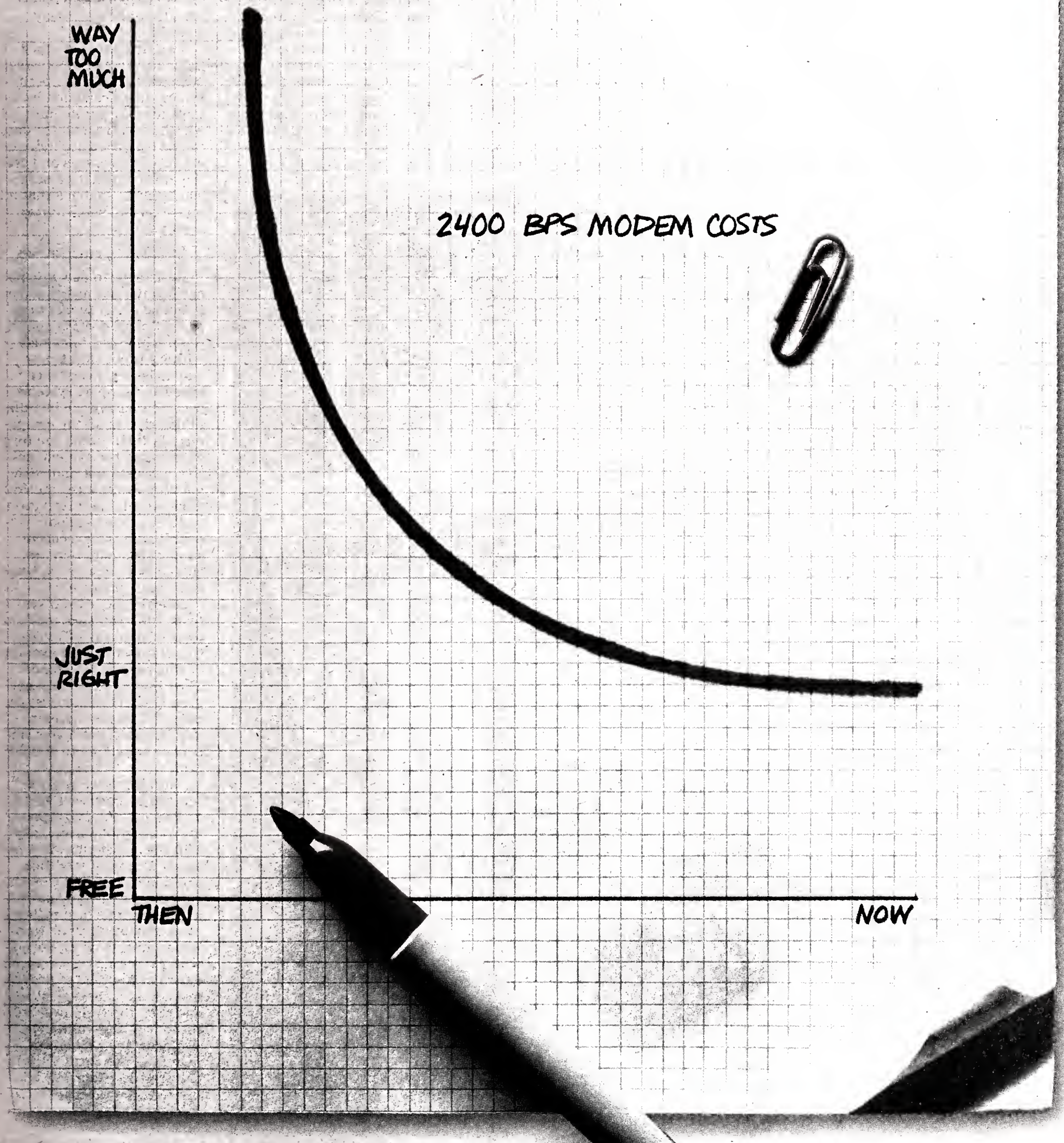


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support system unfeasible. Smokestack was able to establish a management reporting system and then a budget model only after the data requirements between divisions had been standardized and the consolidated reporting system needed for the data base was established.

With communications-oriented executive support systems, the executives need to be linked with the people with whom they communicate. If the people in the executive's communications community do not use or are not on the system, then the executive cannot gain the benefits of using such efficiency-oriented communications tools as electronic mail. At both Manuco and Toy, it was found that executives communicated downward to their subordinates. Support systems were organized horizontally to other executives, and subordinates were not originally on the system. The structure limited the systems' potential utility.

Manuco provides a good example of what occurs when data bases cannot be compared or utilized across different groups. The firm had more than 50 separate divisional and staff data bases, but they could not be used in concert. This situation caused considerable difficulty for the policy-oriented group executives, who complained that the executive support systems could only be of help to them in their work if they could utilize and compare information across divisions and groups. This example illustrates why three of the firms spent considerable time and effort in selecting data base management systems that created relational data bases.

The data bases for executive support systems are often, though not exclusively, extracts of corporate transaction systems. During the institutionalization period, executive support systems diffuse into other divisions and staffs, and usage within corporate subgroups increases. It is necessary to establish corporatewide systems that allow for easy transfer of data.

Two firms that reached the institutionalization stage have approached the problem of standardization by establishing corporate data warehouses from which data can be extracted for individual support systems and setting up common data base management systems that all divisions and subsidiaries must use.

Managing resistance

Resistance to new technology is a normal phenomenon. It can be either an act to protect one's domain or simply a reluctance to change without proof that a new way is better. Resistance to executive support systems occurred during the installation period in all the companies studied. It took the form of avoiding the system, actively resisting it and withholding. Resistance can slow down or cripple installation of an executive support system. Where the executive support systems were installed well, resistance was effectively managed.

In efficiency-based systems, the resistance took the form of nonusage. Toy Electric provided a good example of this passive resistance. The executives already had good support in place: secretaries to pass and screen their messages and administrative assistants to do budgets.

The resistance was expressed by both secretaries and executives. In responding to questionnaires, they said the system was fine and asked for minor modifications, but they didn't use it, because the questionnaires addressed interface rather than compatibility or work issues. In this way, the systems satisfied the perceived desire of the CEO to provide a personal management tool, and then the staff proceeded to work as they liked. At Wellness, the problem of nonusage was dealt with by the president himself, who invited other executives to attend training sessions with him.

Active resistance was evident at Smokestack. The decision support group developed an easy-to-use query system for the vice-president of personnel. He used the system for three weeks and then gave it to his own systems person to operate. The systems person claimed that the new system was inadequate and not as complete as the complex personnel information system already in existence. He was, however, the only one in the corporation who could operate the older system; the new, sim-



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pler system was usable by anyone.

A third form of resistance, withholding, is based on the "information is power" principle. At Manuco, the MIS people were unable to obtain several divisional data bases that would have been helpful to group executives in policy planning, because the divisions did not want their data on a common system.

At International, the divisional presidents were reluctant to provide information for the executive support systems because they thought their autonomy would be affected. A frank discussion about critical success factors was held between the divisional executive and group president, allowing resistance to be handled by negotiation. This is a good example of how resistance can be resolved. Because participation in designing the system was high, end users perceived it as a central tool to their success rather than an infringement on their autonomy.

There are definite patterns in the relationship between the number of elements that are managed well during the implementation process and the effectiveness of the executive support systems. Wellness and International had all the elements present early and promptly and have the most successful implementations to date. Manuco and Toy had the fewest elements, the most problems and ceased the implementation process prior to institutionalization.

Organizational change

Executive support systems are often a lever for organizational change. This change tends to be associated with a new leader's vision of how the organization should function. The executive support system becomes an extension of the leader. It is one of the tools he uses in bringing about a restructuring of the organizational mission. The reports and data in the executive support systems are the message to the rest of the organization as to what indicators count, and the staff members who manage the executive support systems become the gatekeepers of information.

The relationship of executive support and organizational change was clear in this sample. The three executives who sponsored effectiveness-oriented systems had been in their jobs less than a year. They all said that after spending several months getting accustomed to their jobs, they developed a vision of where they wanted to move the organization.

At International, Peter Dewey saw a need to focus the corporation on its future. This focus meant finding ways to communicate critical information to the top of the organization and to bring the divisions in his group into line with a strategic plan. Dewey perceived the firm as complacent because of past success and unrealistic about its future. He also felt that the changes had to be brought about carefully, since theirs was a long history of decentralization of the subsidiaries and no immediate crisis to justify participants' action. He was also conscious that as a group executive he had limited staff and it was not fruitful for him to become involved in the nitty-gritty operations of his divisions.

He saw his increase in effectiveness in being able to make his divisions and the upper management of the corporation focus on strategic planning. For Dewey, the presentation form of information became very important. He felt that graphics allowed people to see trends clearly and kept them from being buried in numbers and paper.

This picture fit the role he saw for himself as communicating crucial information and goals upward to the chairman and down to his divisions. He also used the critical success factors process in bringing his division presidents into agreement with the strategic plan and established a graphics reporting system linked to that plan. Dewey's vision was one that he saw as gradually moving International to its future rather than reacting to crisis.

At this point, the divisions have institutionalized reporting, which addresses the strategic goals.

When Paul Dawson assumed the helm at Wellness, he knew that the traditional sales orientation was not working any more. Dawson had a vision of changing Wellness into a firm that was analytically marketing based. Dawson established his executive support system with a marketing data base and simultaneously established a market research group directly below him to run the system. He changed the reward system for his managers from one that granted bonuses as they met quota on any products to one that required them to meet quota on all product lines.

In the last year, Dawson has restructured the division, amalgamating units and dropping product lines, forcing them to use the system. He has also focused his sales effort on a different market segment. In Dawson's case, the executive support system can be seen as one of the tools in a tool kit for changing the operation and culture of Wellness.

It is worth noting that a significant difference between the executive support systems that are business problem-based and linked to visions of change and those that are oriented to personal management and efficiency is that the communications-based systems are not driven by a vision of organizational change. This may make them more difficult to implement because the executive is actually viewing the system as office equipment, a typewriter or dictaphone, rather than as a central part of his business.

About the author

Eliot Levinson is a visiting scholar at the Center for Information Systems Research, Sloan School of Management, MIT.

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IN DEPTH

How to evaluate micro-based systems

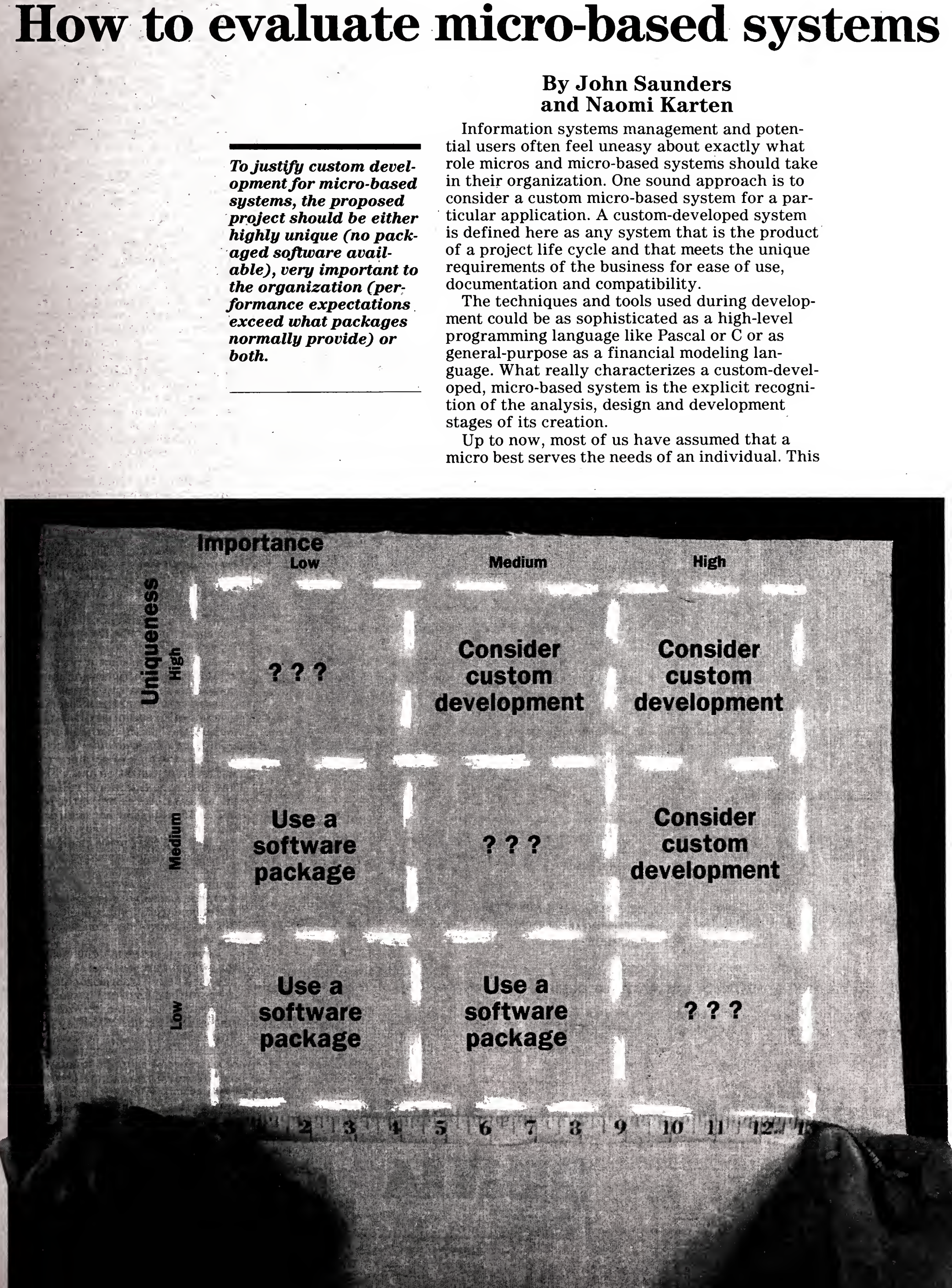
By John Saunders
and Naomi Karten

To justify custom development for micro-based systems, the proposed project should be either highly unique (no packaged software available), very important to the organization (performance expectations exceed what packages normally provide) or both.

Information systems management and potential users often feel uneasy about exactly what role micros and micro-based systems should take in their organization. One sound approach is to consider a custom micro-based system for a particular application. A custom-developed system is defined here as any system that is the product of a project life cycle and that meets the unique requirements of the business for ease of use, documentation and compatibility.

The techniques and tools used during development could be as sophisticated as a high-level programming language like Pascal or C or as general-purpose as a financial modeling language. What really characterizes a custom-developed, micro-based system is the explicit recognition of the analysis, design and development stages of its creation.

Up to now, most of us have assumed that a micro best serves the needs of an individual. This



view recognizes that the micro can focus considerable processing power on a specific problem.

When used with general-purpose software, this power is easily applied to a wide range of specific needs. The analyst who works with a large amount of financial information can use a spreadsheet package every time he needs to prepare a worksheet. The manager who must prepare a large number of reports can rely on a word processing and graphics package to generate high-quality copy. In both cases, however, the user applies a general-purpose tool to the specific tasks he faces.

However, micros can also serve other purposes within an organization, extending beyond the specific requirements of an individual. One theory provides a four-way classification scheme for information systems. Gordon David, in his book *Management Information Systems*, describes all information systems within an organization as being either personal or public, as well as formal or informal. These classifications account for automated or manual, mainframe-based or micro-based systems.

Given the processing and memory capacity of micros, there is no reason they should not be applied to systems in the middle levels of the systems pyramid. This is particularly true in cases where a communications link can be established to the mainframe.

In terms of this classification scheme, an automated general ledger system would be a public, formal system in that it would serve the requirements of the organization in a formal manner. Similarly, the Rolodex file maintained by an employee is also an information system, but it would fall into the private, informal category. Such an information system clearly serves only the needs of the individual who uses it. The organization has no requirements for how the Rolodex is to be organized or maintained.

Micros have largely been relegated to the role of private, informal information systems within organizations. Most firms assume that users should have direct control over their use of a micro and that this view is appropriate since the tasks they perform are personal in this sense. The desire of some DP managers to reduce their applications backlog by sharing the burden with users drives this assumption. The assumption is encouraged by the easy availability of packaged software designed to help inexperienced users meet general needs. In a sense, the entire information center concept of supporting and advising users is intended to encourage direct user control of micros.

But while there may be strong incentives for organizations to encourage the use of micros to meet private requirements, there is no reason that micros cannot also be considered for certain public, formal systems. Keep in mind that the processing capacity of micro hardware has increased enormously in the last few years. The processor at the heart of the Apple Computer, Inc. Apple II could handle 300,000 to 400,000 instructions per second. The recently announced Motorola, Inc. MC68020, on the other hand, can process four to five million instructions per second, an increase of more than one order of magnitude in processing speed alone.

The instruction set of modern microprocessors has also become considerably more advanced, resulting in more compact and efficient programs. Similar progress has been made in main memory and disk storage capabilities. The results of these advances in technology are small machines that are in some ways as powerful as the mainframes and minicomputers of previous years.

One can think of the information systems in an organization as a pyramid. At the bottom lie the transaction processing systems, which account for the bulk of data processing within an organization and which have been the traditional realm of mainframes. At the top of the pyramid reside information requirements that are generally difficult to define and that are constantly changing. The need of a top executive to prepare a three-year business plan might fall into this category. Microcomputers used with packaged software have traditionally been applied to these kinds of decision support needs.

However, at the middle levels of the pyramid are systems that do not have the heavy transaction processing requirements of the lowest level and yet are more standardized and static than systems at the top level. These systems usually address control and short-term planning needs of a firm, take as input standard data from the transaction processing systems and produce reports that aggregate this data in a predefined way.

Given the processing and memory capacity of micros, there is no reason they should not be applied to systems in the middle levels of the pyramid. This is particularly true in cases where a communications link can be established to give the micro access to the mainframe data base for downloading information. What managers need to know, therefore, is

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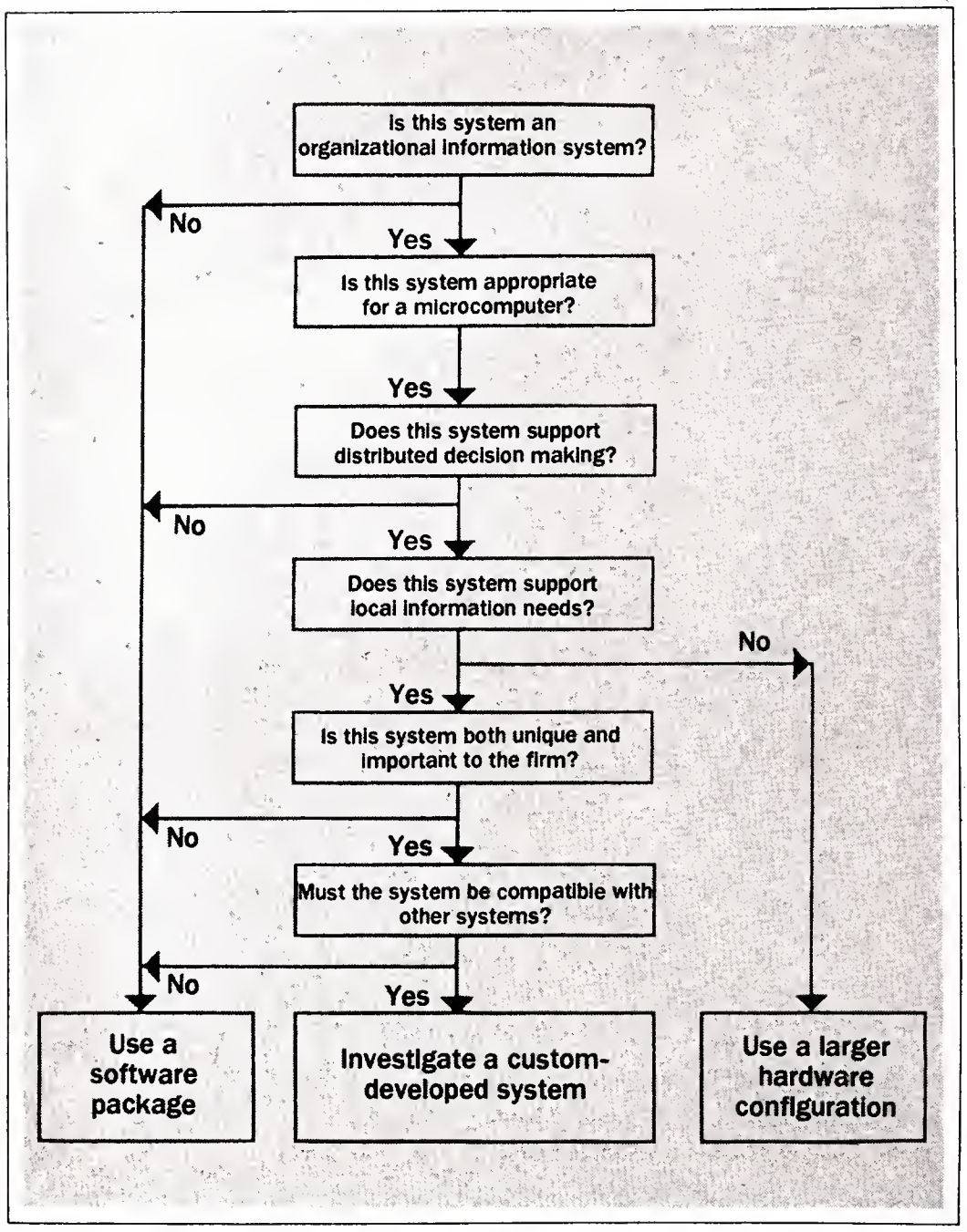


Figure 1. Tests used in choosing a development methodology

how to determine when a micro is appropriate for such an application and how to approach the development of the system when that determination is made. The following sections describe a methodology for identifying systems that are public and formal in nature and good candidates for a micro-based system.

Identifying custom projects

How does one decide on a development strategy for a system that might be appropriate for a microcomputer? The answer is contained in a series of tests to which proposed applications can be put. For the purposes of these tests, the manager should assume that the menu of strategies includes developing a system on a microcomputer, acquiring a software package or using a larger computer with either a software package or a custom-designed system. Figure 1 outlines the test sequence.

1. Is the proposed application an organizational or a personal information system?

A personal information system is one that meets the needs of a single person by keeping track of data of interest only to that user and that performs functions designed and used only by that user.

Insofar as micro applications are concerned, a software package can certainly meet the truly individual needs of a manager.

If, however, the system uses data that is standardized across an organization or performs processing that is standardized across an organization, it may be thought of as an organizational information system and may require a custom development effort. In this case, the proposed application should be submitted to the next test.

The micro can be an effective tool for middle-level decision making because it focuses processing capacity where it is required.

2. Is this application appropriate for a microcomputer?

This question implies a number of further tests, as follows:

2a. Does the application support decision making that is highly distributed throughout the organization?

We must ask this question in order to filter out those projects that support very centralized information needs. Such centralized decision making (such as companywide financial reporting to a chief financial officer) often should be supported by a centralized data processing operation. At lower levels of an organization, however, decision making often relies on local information; centralizing the processing of such local information can slow the turnaround times of essential reports. The micro

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can be an effective tool for middle-level decision making, therefore, because it focuses processing capacity where it is required. The result is almost immediate availability of information.

There are other organizational advantages to decentralizing data processing capacity besides providing timely reports to local managers. For one, decentralization can sometimes enhance security of data maintained on a central computer. Suppose a small staff group is responsible for preparing a biweekly report to an executive committee and that this group relies on operating data read from tape on a central computer. A production manager in the same organization uses this operating data to make critical production decisions. There is always the possibility that the first group will inadvertently destroy or lose the operating data in manipulating it for the report. A system could be designed, however, to transfer the necessary operating data from the central computer to a micro and allow the staff group to make the manipulations it desires in preparing its report.

2b. Does the application support information needs that are highly localized?

This question should also filter out projects that support centralized information needs, as the previous question does. However, the question admits projects that are localized rather than distributed. Localized in this sense means projects that support information needs at only one location. For example, the marketing director of a small subsidiary company may manage his sales force in a way completely different from the managers of all other subsidiaries. His needs are local.

The example in the previous section also described a localized information processing need. Applications that are distributed represent identical information processing needs repeated at various points throughout an organization, usually at middle levels. It is quite possible, therefore, for a distributed application to be localized, although a localized application will not be distributed.

3. Is the application both unique and important?

This is a question of the marginal economics of a custom-developed vs. a packaged software approach to a problem. If the application is appropriate for a micro (as determined by the previous tests), then the next step is to determine if the benefits of a custom system will outweigh the costs.

One approach to this problem takes a qualitative perspective. It begins by mapping the project on a three-by-three matrix, which plots uniqueness vs. importance (see diagram on ID/17). In order to justify a custom development effort, the proposed project should be unique (in which case there will be no packaged software available for the application), very important to the organization (in which case the software must meet performance standards that exceed those of most packages) or both. In terms of the matrix, the project must fall in one of the three boxes on the upper right-hand corner in order to justify custom development.

In mapping the proposed project on this matrix, determining application uniqueness is simpler than determining importance. One might begin by determining the availability of packaged software to meet the needs of the application. This implies, naturally, that the requirements of the system are already well understood. In any case, it is generally true that the more unusual a given application, the less likely a packaged software product will be available for it. In making this determination of uniqueness, therefore, one might ask:

If the application is appropriate for a micro (as determined by testing), then the next step is to determine if the benefits of a custom system will outweigh the costs.

- Can functionality be added easily to a packaged product to meet changing user needs?
- Is the package compatible with other systems now in use in terms of data, input and output requirements?
- Can the package handle the size of data base required by this application?
- Does the package provide an appropriate user interface?
- Does the package have the processing speed necessary for this application?
- Will support be available for implementation and use?

If a package meets these or other appropriate criteria, it can be considered an alternative to custom development. Otherwise, the application may be viewed as unique. Compatibility is significant enough that it is treated as a separate test below.

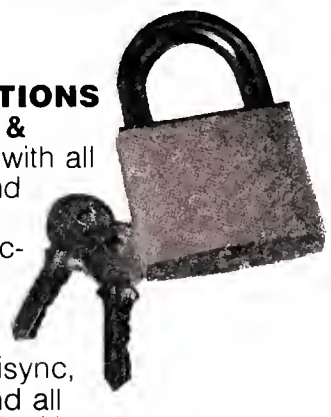
Judging the relative importance of an application is a more difficult task. The extreme cases are often self-evident. For example, a claims processing system is critical to an insurance office, since no work can be accomplished without it. But the marginal cases are more difficult.

One approach relates the relative importance of a proposed system against systems already in operation. One might prepare a list of

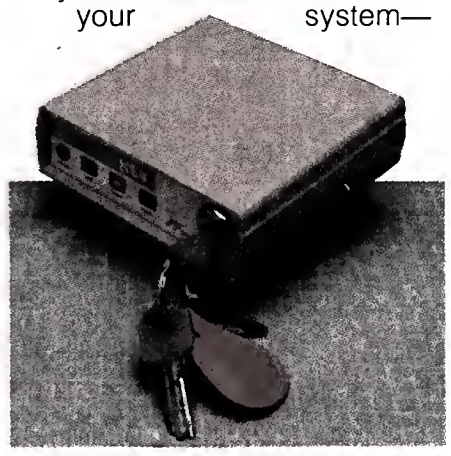
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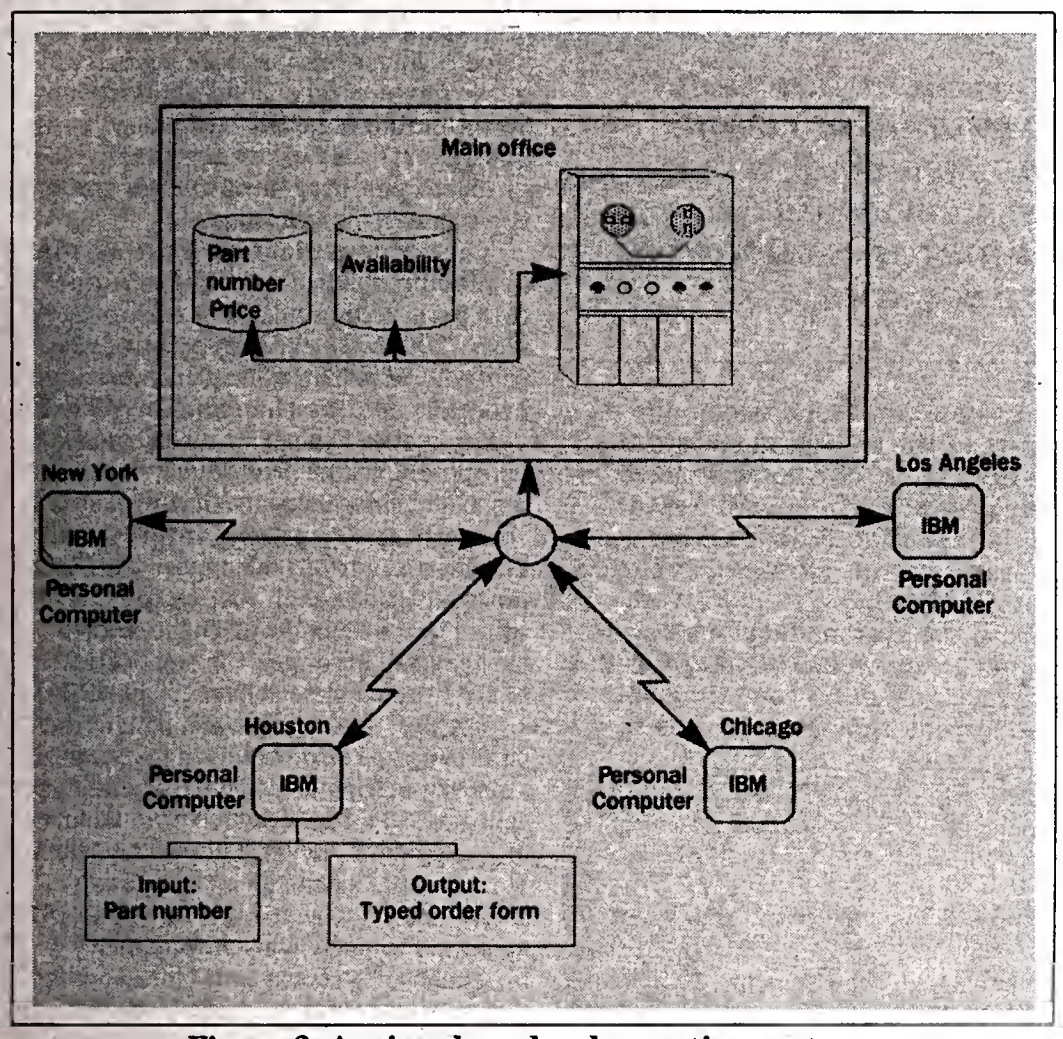


Figure 2. A micro-based order costing system

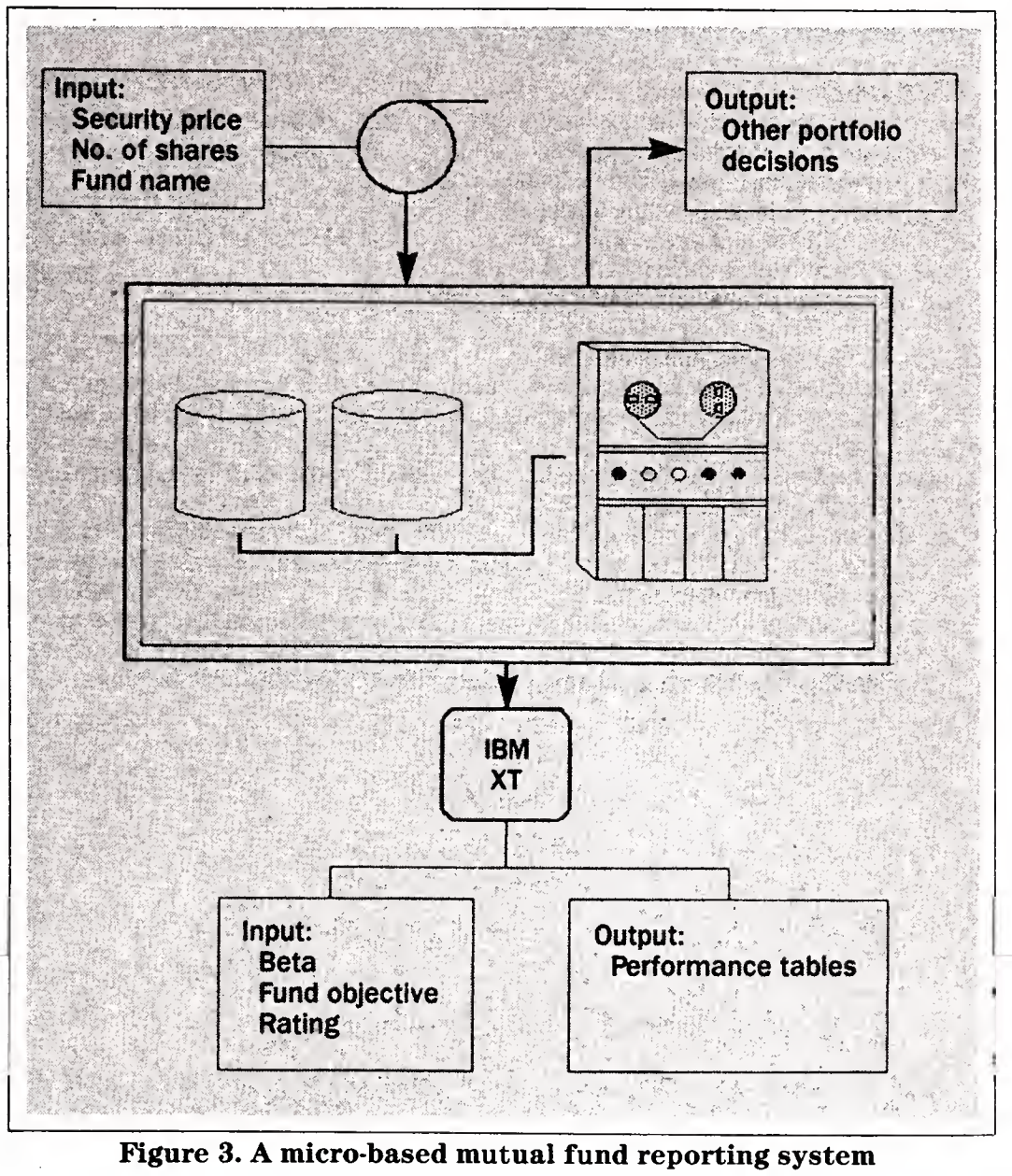


Figure 3. A micro-based mutual fund reporting system

applications in use, ranging from customer billing to a spreadsheet package used by a manager to prepare budgets. Note that these systems need not all reside on a microcomputer, nor do they have to be computerized. It is only necessary that a reasonable range of discrete operations be compiled. The proposed project can then be ranked against operations in existence in order to determine how critical it actually is to the organization.

There are subtle ways in which the judgment of a system as relatively unique and important can interact. For example, the degree to which a project is highly distributed throughout an organization can affect its "importance." An application that would be used in all the marketing offices of an industrial equipment manufacturer would be more important to that firm than one that would appear in only one office. The application that is widely distributed would yield higher benefits in total productivity gains than an application that is extremely localized. Hence, all the issues of distribution, localization, uniqueness and importance must be considered within the analysis of the problem. That interaction should come out in this stage of the analysis.

4. Must the system be compatible with other systems in use?

This last criterion may be the one that most often justifies custom development efforts. Even if the proposed system is not unique and does not rate high in terms of importance to the organization, the requirement that it be compatible with other systems in that firm is often enough reason for custom development. "Compatible" means that the system uses data in the same format as the systems used by the organization as a whole, that it produces reports that appear in the same format as those of the organization, that it is able to communicate directly with the centralized data processing system of the organization and/or that the language in which it is constructed is the same as, and meets the standards of, the organization as a whole.

An example illustrates the notion that a micro-based application should serve needs that are localized and distributed throughout an organization. A manufacturer of industrial process control equipment marketed its products through a large number of local sales offices. These offices were staffed by sales engineers who worked closely with customers in helping them choose the proper equipment configuration for their needs.

Because the company produced thousands of individual items that could be combined in many ways, the process of preparing orders for the customer was time-consuming. It involved looking up all the items required by the customer, checking their compatibility and availability, finding their price and filling out a complicated worksheet.

The firm addressed this problem by developing a micro-based system that could retrieve price and availability information from the mainframe and prepare an order costing sheet (see Figure 2). The system was used in each of the sales offices of the firm by the sales representatives. They could prepare a proposal for a customer based on the most recent price and availability information on the central system.

This arrangement decreased the time necessary to prepare proposals and allowed the sales staff to be much more responsive to customer needs.

The project met several of the criteria discussed in section two. The need for the application existed in each of the local sales offices of the company, making it distributed. The application was also quite specific to the parts list and pricing scheme of the firm. In fact, an early prototype developed using Ashton-Tate's Dbase-II turned out to be unbearably slow.

Finally, because of its wide distribution throughout the marketing organization of the company, the project was easily justified by the increase in productivity in each sales office. The system did not represent

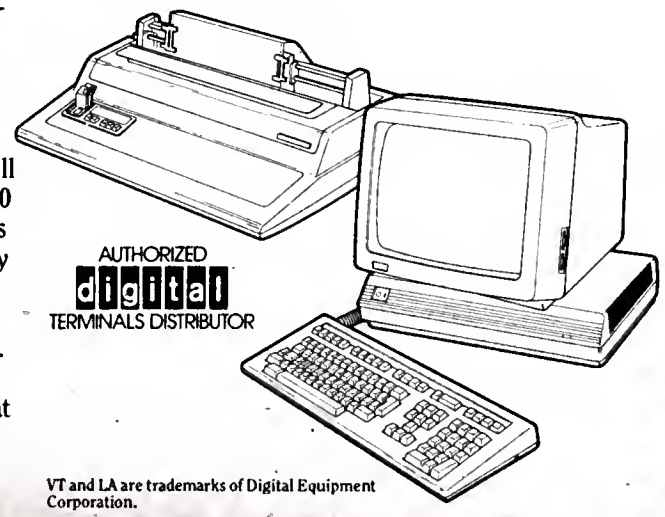
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a critical function for the firm in any sense. Orders were, and probably still are, prepared by hand. But the system had the potential for greatly reducing the time necessary for preparing proposals and orders for customers. The system also would standardize the ordering process and provide information to the manufacturing operation about sales much more quickly. Thus, the cumulative benefits of the system justified custom systems development.

The second case illustrates the opposite situation. An investment advisory firm tracked the performance of about 600 mutual funds and published its data in a newsletter. The data used in this activity included several measures calculated from current security price data. A small staff group carried out the calculations necessary in compiling these tables, using, in part, security price data read from pricing tapes. Another group within the firm also used these pricing tapes in managing clients' investment portfolios.

One firm, rather than add another function to its minicomputer, chose to build a custom mutual fund tracking system for a microcomputer. The system would be totally dedicated to the task of compiling biweekly performance data.

The firm felt that the job of compiling performance statistics should be automated. This would allow the staff greater freedom to pursue special analysis of the raw performance data. However, rather than develop the system for the minicomputer that read the pricing tapes and that the firm's portfolio managers used in their jobs, the company chose to build the mutual fund tracking system for a microcomputer (see Figure 3 on ID/23).

Both the system developed and the hardware would be totally dedicated to the task of compiling biweekly performance data. The system would download the necessary price information from the minicomputer to the micro, read other information from manual data entry, compile reports and allow the staff group to perform limited analysis of the basic information.

This system illustrates the virtue of placing a critical business function on a dedicated piece of hardware. The biweekly reports represented one of the most fundamental products sold by the company. This value in itself justifies a custom development effort. However, further justification was provided by the competition for pricing information between portfolio managers and the mutual funds tracking group. The importance of each of these activities argued strongly for separating their functions as much as possible.

Finally, since the work of the mutual funds group included some analysis of performance figures, the system had to allow for possible future enhancements. Even though the need for the application was extremely local, the critical nature of the application, the need for compatibility with other systems and the need for a modular design all required custom development.

In a final example, a large commercial bank recently decided to enter the municipal bond registration and transfer agent business. It already offered government banking services to municipalities, specifically by providing advice on the preparation and marketing of a new bond issue. In making the decision to enter the registration business, the bank also recognized a need for a high-quality system to support the service. Yet, while the bank realized that the volume of registrations it would handle was small and that a microcomputer could handle the required data base, it was unable to



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locate a suitable software package.

The bank met this need by specifying and building a microcomputer-based system to manage the process of registering municipal bonds and transferring the ownership of certificates. The system was built using such standard development tools as the C programming language, a commercially available data base management package and AT&T Bell Laboratories' Unix operating system. Unlike the previous examples, this system operated in isolation from other systems at the bank. It received all input through data entry operators in the bond registration area of the bank and produced all output locally, including all regular interest and principal payment checks.

This project met several of the requirements mentioned in the previous section. First, the application was critically important to the business of providing registration and transfer agent functions. In an important sense, the system that managed registrations and transfers was the business. The bank had a strong motivation, therefore, to seek out the most effective system it could find for this application.

Second, the application was unique in that no packages were available for mini and mainframe computers, but these were too large for the scope of the business the bank had in mind.

Finally, the operation was extremely localized. It was run by fewer than 10 professional and clerical staff. Information fed into the system from only one location in the bank, and processing took place in only one location.

There are many situations in which organizations should pursue a custom development strategy for micro-based systems. Demand for these systems exists in most industries, in all functional areas and at most organizational levels.

All these examples demonstrate that there are many situations in which organizations should pursue a custom development strategy for microcomputer-based systems. Demands for such systems exist in most industries, in all functional areas and at most levels of organizations. These systems are typically organizational and localized.

End users and MIS management must recognize that many information management problems have these characteristics and that microcomputers can accomplish a great deal more than run word processing and spreadsheet application software. Of course, many firms are coming to this realization, particularly now that hardware such as the IBM Personal Computer AT is available to support truly multiuser, multitasking systems.

Indeed, the potential of micro-based, multiuser systems suggests that we may see a reverse of the trend found in mainframe environments, which has been from custom to packaged software.

About the authors

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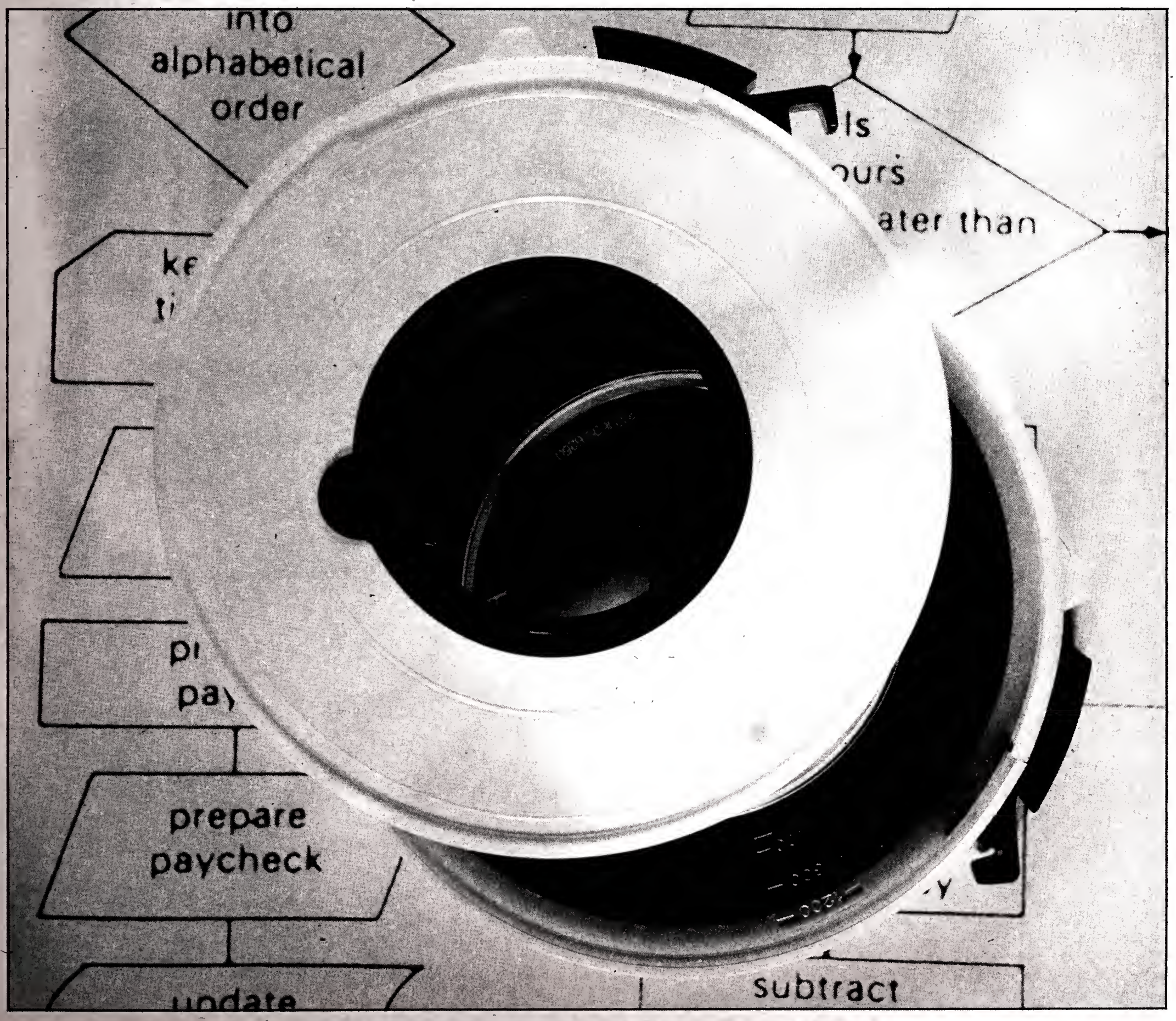
Trends in software protection

By Stephen Becker

Software patents are not for everyone. They protect only certain types of software and must pass a stringent examination process at the U.S. Patent and Trademark Office. They are expensive because in virtually all cases a patent attorney must be hired to do the work. In addition, the period of time required before the patent is granted is substantial. The process can take up to two years or more, and a patent has no teeth before it is granted. But once the patent is granted, it is formidable.

Unlike a copyright that covers only expression, a patent protects the concept behind your software. Whereas you must prove actual copying of your software by another person to show copyright infringement, patent infringement does not require copying; it covers competitive software that is independently developed after yours.

A trade secret must be a secret. Once your software becomes known to the public (and this can be done by a competitor who may reverse engineer your software), trade secret law is lost. Software protected by a patent, however, does not have to be maintained secret. Legal protection extends even to different but equivalent software that may have been written independently or by reverse engineering yours.



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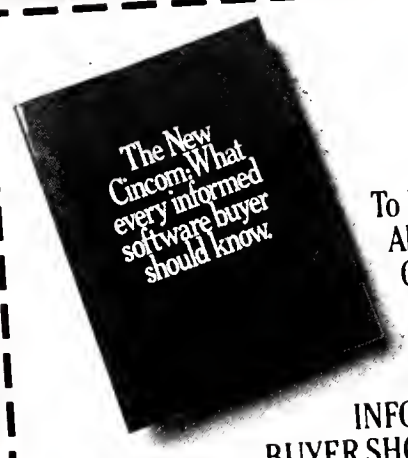
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A patent is a right granted by the government to an inventor to exclude others from making, using or selling the patented invention in the U.S. for a 17-year period. Thereafter, the public owns the invention. In exchange, the inventor must make a complete disclosure of the invention in a patent application that is published after the patent is granted.

During the period of time when the patent application is being examined at the U.S. Patent and Trademark Office, the invention is maintained in secrecy; there is absolutely no way for the public to gain access to the information in your patent application before it is granted.

Suitable disclosure

Probably the best type of disclosure on computer software is a complete flowchart together with commentary describing the type of computer hardware used with software, the nature of the input signals to which the software responds and the types of output signals generated. A patent attorney will prepare all the necessary documentation for the patent application, but you will have to spend quite a bit of time with your attorney developing a suitable patent disclosure.

Patent attorneys must be registered with the Patent and Trademark Office. You can obtain the names of patent attorneys in your area by writing the U.S. Patent and Trademark Office, Washington, D.C. 20231. Be sure to select an attorney who has had experience with software-related cases.

A patent covers only subject matter that is new and is not obvious from what has been done before. Your patent attorney will have a search made at the Patent and Trademark Office to determine whether your software invention appears to be patentable before a patent application is prepared. You must work closely with your attorney to prepare the patent application because you will probably be more familiar with the technology.

After the application is filed at the Patent and Trademark Office, a patent examiner who specializes in software-related inventions makes a search of his records to determine whether your invention is patentable. You will, in a sense, also be working with the patent examiner, showing him the closest software to yours of which you are aware, reviewing what the examiner locates during his search and, with the help of your attorney, negotiating the scope of your patent.

Patents on software

In the past, there has been quite a bit of controversy over whether software or systems involving software are patentable. The problem is that certain types of subject matter resembling software have been determined by the courts to be incapable of being patented. For example, it is not possible to patent a mathematical algorithm or equation, such as the Pythagorean theorem, although it is possible to obtain a patent on a process or machine that in some way applies that theorem.

It is also not possible to patent a mental process, a method of doing business or a scientific principle. Early court cases were pro-software, finding ways whenever possible to justify patenting computer-related inventions.

Then, in 1972, the U.S. Supreme Court issued an adverse decision in a case involving a program for numerical conversion on the grounds that an invention involving a mathematical algorithm that has no practical application except in connection with a digital computer is not patentable because patents of this type would effectively preempt use of pure mathematics.

There was a concern in the legal community that computer programs, which



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IN DEPTH/SOFTWARE PATENTS

Dean Witter Reynolds attacked the validity of the patent on the grounds that the patent is a method of doing business that traditionally is unpatentable subject matter.

by their nature involve algorithms, are not patentable and that processes and machines involving programs are also not patentable. For a time, some attorneys were actually converting software into hard-wired circuits in patent disclosures to avoid rejections by the patent examiner. It became unclear whether at one extreme all inventions involving software of any type were unpatentable or, at the opposite extreme, only mathematical algorithms were unpatentable. This situation created quite a bit of confusion that was resolved only recently.

In 1981, the Supreme Court heard a patent case involving a program used in a rubber curing system. The temperature at various points within a mold was measured and supplied to a programmed computer. The computer processed the temperature measurements using a mathematical equation to open the mold at the exact time for optimum curing. The Supreme Court held the invention to be patentable, reopening the door to software-related patents.

To determine what types of software inventions may be patentable, the court used a test adopted from a lower court. The patent claim must first be analyzed to determine whether it recites a mathematical algorithm. If the claim does not recite (directly or indirectly) a mathematical algorithm, then the invention is patentable if it is new and not obvious over what has been done before. If the claim involves a mathematical algorithm, however, the invention nevertheless may be patentable if the claim does not completely preempt that algorithm. In other words, as in the rubber curing case, which involved measuring temperatures and opening a mold, there must be something in the software that goes beyond merely solving a mathematical algorithm.

The Patent and Trademark Office recently issued program patent examining guidelines endorsing the judicial test. Rather than dwelling on the types of software inventions that are not patentable, the guidelines instruct the examiners how to determine whether the software is new and unobvious and whether the patent disclosure is adequate.

Numerous patents have recently been issued on software inventions of various types. Last year, the District Court of Delaware reviewed a case between Merrill Lynch, Pierce, Fenner and Smith, Inc. and Dean Witter Reynolds, Inc. on a patent owned by Merrill Lynch covering its Cash Management Account program.

Dean Witter Reynolds attacked the validity of the patent on the grounds that the patent is a method of doing business that traditionally is unpatentable subject matter. However, the District Court of Delaware held the patent to be valid because the invention is a machine (programmed computer) and not a business method. The focus of the analysis must be on what the system is (a programmed computer), not on the use to which it is put.

In my opinion, the Merrill Lynch case goes too far. The categories of inventions, such as business methods, traditionally considered unpatentable, should not become patentable merely because they are practiced by a computer rather than by a human being. Nevertheless, the Merrill Lynch case has not, to my knowledge, been appealed, and the patent is being widely licensed.

Patents like the Merrill Lynch one are now being granted routinely by the Patent and Trademark Office. Unless there is a shift in the law, the

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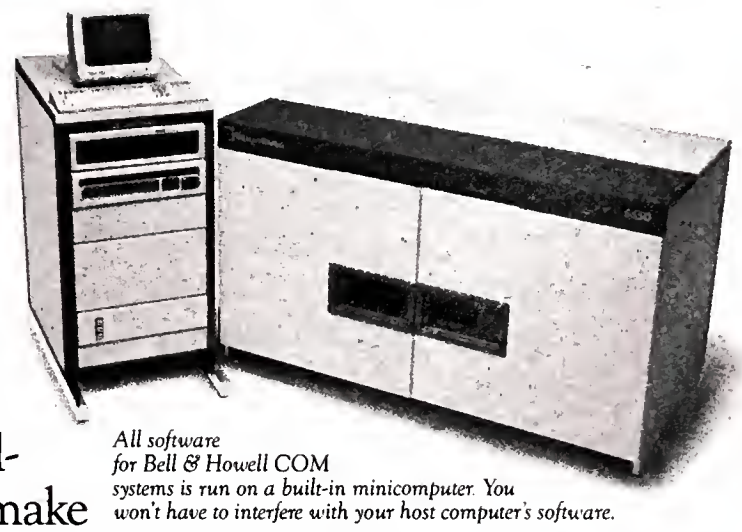
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patents will be enforced in the courts.

In addition to the expense and length of time involved in obtaining a patent, the majority of software is not patentable despite liberalization of the law, because the software is not inventive enough. Most software, such as accounting programs, is just a rehash of functions previously done manually, only faster.

There is no guarantee that despite your attorney's best efforts, a patent will ever be issued. The examiner may simply refuse to grant the patent because he considers the software invention to be unpatentable.

Patent pending

Even if you appeal, you may lose. Although you can identify your program as having a "patent pending" while your patent application is before the examiner — and this may discourage some potential competitors — you have no real legal right until the patent is actually granted.

Patents are often criticized as being no more than "licenses to sue." An infringer might contest the validity of your patent in court, as Dean Witter Reynolds did in the Merrill Lynch case, and it is extremely expensive to defend a patent case. Statistically, as many as one-half of all patents that are challenged in court have been found unpatentable (patent opponents like to flaunt this), and appeal has been unreliable since the attitudes of various appellate courts have varied substantially.

On the other hand, fewer than 1% of all patents that are issued are ever litigated. It is only the weakest patents that are litigated; most cases involving the remaining patents are settled out of court. Although only about one-half the patents that are challenged in court survive, remember that in virtually any area of litigation half the parties win and half lose.

A practical problem with software patents is that they are difficult to examine properly. How do you determine whether software is new and unobvious? All software that is maintained as a trade secret and most software in the public domain is not in the files of the Patent and Trademark Office. Bearing in mind that the patent examiner has only several hours to do research, how does he locate and determine how prior software operates, particularly if no flowcharts are available?

This limitation is one reason that the Patent and Trademark Office previously opposed patentability of software inventions. During litigation, however, your opponent may have the resources to hire a small army of attorneys and experts to attempt to locate earlier software as evidence that your patent is invalid.

Brighter days

Despite various problems, software-related patents are becoming stronger and more widely used. Patent attorneys are becoming more proficient at drafting software patent applications, and the Patent and Trademark Office has hired a battery of new computer expert examiners. Although patents will never be perfect because all prior software, some protected by trade secrets, will never be before the examiners, new techniques for searching the software literature using data bases are being adopted by the Patent and Trademark Office.

Patent appeals have been consolidated into a single court, the Court of Appeals for the Federal Circuit, which tends to be more pro-patent than the Circuit Court that previously heard appeals. Patents are now more likely to be enforced, and a consistent body of laws will be established.

Because patents are expensive and will not be appropriate in every case, you should consider patent protection only for software that meets all of the following conditions:

- A commercial lifetime greater than about five years.
- Substantial commercial value.
- It involves more than the solution of a mathematical equation.
- It is clearly novel and unobvious — not a rehash of manual procedures, such as bookkeeping.
- It embodies a concept that is likely to be copied. ‡

About the author

Stephen Becker is a patent attorney with Lowe, King, Price & Becker in Arlington, Va. He specializes in computers and software.

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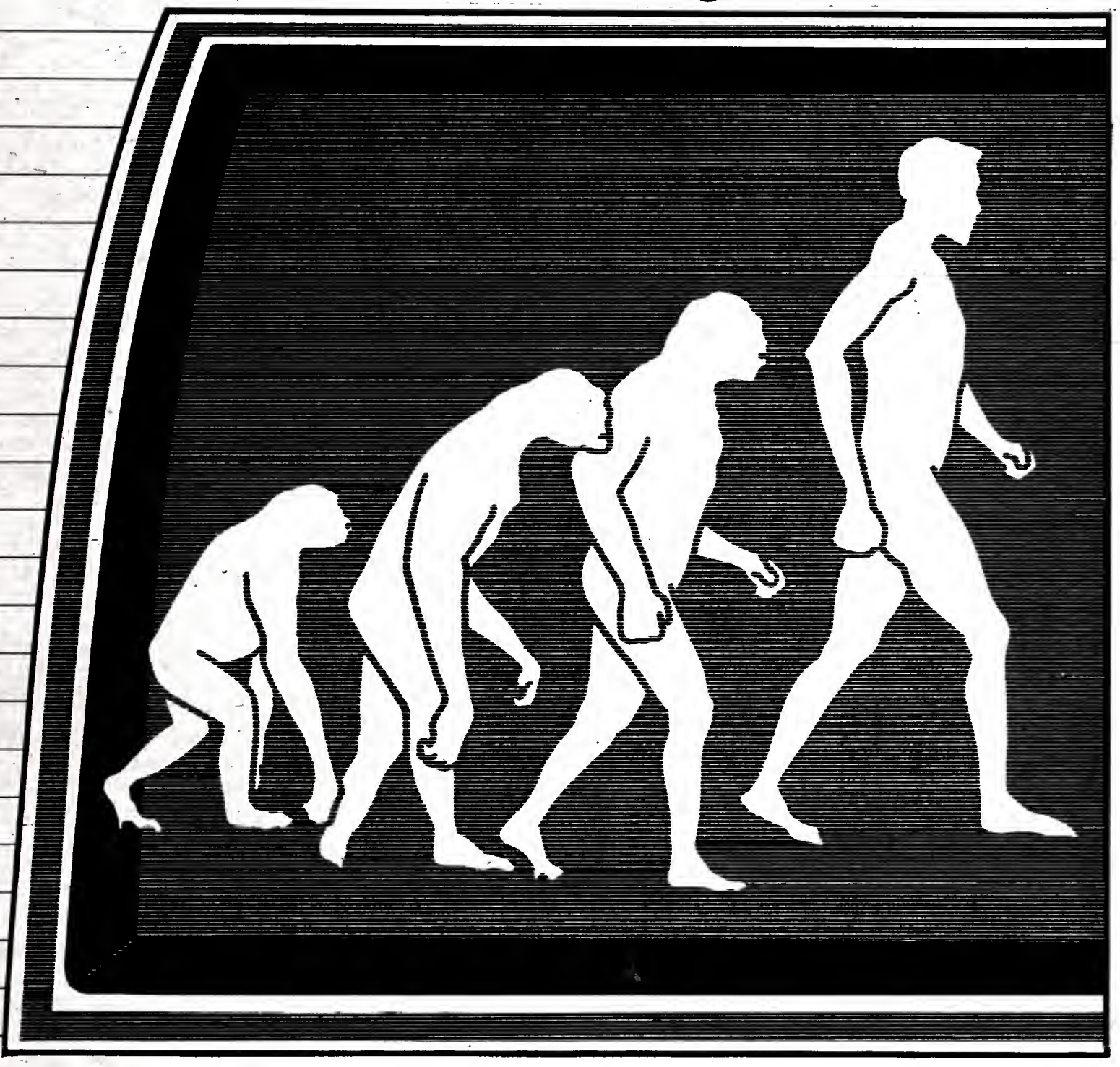
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SPECIAL REPORT

Data communications terminals

The evolving human interface



November 26, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Daunted by bouts with micros, terminals look for niche

By Tom Henkel
CW Staff

The days of the traditional CRT terminal — a unit with little or no intelligence used solely to communicate with a large computer system — appear to be dying. The popularity of desktop microcomputers and the availability of inexpensive off-the-shelf components have permanently altered the way many organizations view data processing. Consequently, there has been an increased user demand for local processing power plus the ability to access data stored in a host processor easily.

But while most industry watchers agree the traditional role of CRT terminals has been irreparably changed, there still is considerable disagreement over when the market for relatively unsophisticated terminals will breathe its last. Some analysts say the demand for microcomputers has already severely limited the use of CRT terminals. Others, however, maintain there is still a huge market for inexpensive CRT terminals, especially among clerical workers who do not really need local processing capabilities.

"People forget just how many terminals there are out there," noted Melody M. Johnson, an analyst with the Seattle brokerage firm of Cable, Howse & Ragen. Just the replacement market for popular terminals like Digital Equipment Corp. VT100 and IBM 3270-type units could generate enough business to keep the industry alive for several more years.

The price gap

Furthermore, Johnson noted, there is still a considerable rift between the price for an unsophisticated terminal and microcomputer systems. That gap is large enough to cause many companies to think twice about putting a micro on every desk.

Ilene Goldman, an analyst with International Data Corp. (IDC), a Framingham, Mass.-based market research firm, noted that an IBM 3270-type terminal can cost roughly half as much as a well-configured microcomputer. Goldman added that many companies, such as banks and insurance firms, use terminals mainly as a means to give workers access to data stored in a host mainframe.

For those users, there is little need for local processing capabilities, Goldman said, adding that few companies are willing to spend extra money to give employees capabilities they do not really need.

Johnson explained the trend toward desktop microcomputers has been very application-specific. For executives and secretaries who need to perform a variety of tasks, microcomputers have been a boon. But for clerical jobs, such as data entry, few companies have switched to using microcomputers over terminals. In fact, Johnson explained, many microcomputer companies don't know how to sell their products for so-called "back-office" applications.

The cost difference between terminals and microcomputers may be a temporary issue, noted Kenneth Bosomworth, president of Norwalk, Conn.-based International Resource Development, Inc. (IRD). Bosomworth said successful microcomputer makers are quickly building sufficient economies of scale into their manufacturing operations to negate the cost difference between terminals and microcomputers.

For example, even though a microcomputer tends to use more expensive components than standard terminals, Bosomworth explained that the microcomputer vendor capable of producing 100,000 processors a month may be able to sell the systems at a lower cost than a terminal manufacturer who makes 10,000 units a month. Currently, Bosomworth said some low-end microcomputers are already priced to compete favorably with terminals.

The popularity of desktop microcomputers and the availability of inexpensive off-the-shelf components have permanently altered the way many organizations view DP.

But the disadvantage of bargain-basement micros is that they often do not allow users to switch between local processing and terminal modes easily. Some, Bosomworth explained, require users to load communications software onto the system before the unit can be used as a terminal. Bosomworth said users must be able to switch easily between terminal and local processing sessions for the micro to be convenient.

He also said most microcomputer vendors could, and probably will, adapt their products to include the communications software in read-only memory. This would allow the user to choose either a terminal or local processing mode by flipping a switch.

One solution to the terminal/microcomputer issue is a hybrid product that offers both microcomputer capabilities as well as easy access to a mainframe in a terminal mode. IDC's Goldman noted IBM's 3270 Personal Computer offers such hybrid capabilities, but the unit is still more expensive than some 3270-type terminals.

Terminal makers are not taking the assault from the microcomputer community lightly. Most have taken advantage of off-the-shelf components to give their products some local intelligence.

"There are really no dumb terminals any more," Johnson said, adding that most terminal makers have discovered that producing an intelligent terminal does not typically cost any more than making a dumb terminal. Consequently, Johnson predicted the the already blurred distinction between terminals and microcomputers will become further confused with low-end microcomputers offering the same basic capabilities as high-end terminals.

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Contributions to the Special Report should take one of two forms: tutorial articles discussing issues or applications stories outlining a particular user firm's experience.

Articles may range in length from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached. The submission deadline for the February Special Report is Dec. 28.

If you have any questions, send them to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham 01701.

INSIDE



Daunted by bouts with micros, terminals look for niche/**SR/2**

Terminals holding their own against micros/**SR/3**

Multifunction units to expand share of office market/**SR/4**

Communications network keeps freight firm on track/**SR/7**

Demand for integrated voice/data tools accelerating/**SR/8**

Net processor credited with uniting bank's protocols, cutting costs/**SR/10**

Software lets firm keep track of leases, anticipate bills/**SR/14**

Purchasing gear need not cause terminal headaches/**SR/16**

Bargain net helps DP staff get system on-line on time/**SR/17**

Interim network makes installation a hookup away/**SR/17**

Expanding ATM networks draw consumers' interest, process 3.4 billion requests a year/**SR/18**

Migration path from VDTs key in agency's choice of micros/**SR/22**

Wise terminal makers will heed end-user demands/**SR/24**

Rise of automated office accompanied by continued debate over possible VDT health hazards/**SR/26**

POS system keeps bookstore personnel in the know/**SR/28**

Food lab's work flow monitored by terminals/**SR/30**

Fiber optics offers prudent alternative to EIA choices/**SR/32**

Investment in ergonomics can pay healthy dividends/**SR/33**

Device upkeep maximizes benefits, minimizes costs/**SR/34**

Scholar praises electronic fellow/**SR/36**

SPECIAL **REPORT**

Terminals holding their own against micros

Maintaining position in large data-entry, editing environments

By Ilene Goldman
Special to CW‡

A great deal of discussion has arisen among users and vendors alike concerning the possible impact of personal computers on the terminal market. Initially, most analysts predicted that the influx of the personal computer would trigger the decline of the terminal market. Embedded in this prediction was the notion that a terminal user would come out ahead by making the swap for the new device providing access to both worlds — terminal emulation and local processing.

After the novelty of the personal computer wore off, evidence of a different sort became apparent. For large, semidedicated data-entry and local editing environments, the terminal was, and is, by far the most cost-effective tool. This is not to imply that personal computers will not capture any of the high-end terminal market. They will, and have, but not to the degree analysts or vendors expected.

The key to the migration of terminals to the microcomputer is largely a function of vertical market applications. Purchasing schemes for terminals and micros in the banking, insurance, medical, utilities or retail world are often dissimiliar in nature. While one industry may be heavily host-application-dependent, another may have a mixture of host application and local processing needs. In environments where local processing outweighs, or is at least equal to, the amount of host-related applications, the microcomputer is a viable alternative.

More users when costs drop

If a terminal is used solely to interact with the host, replacing the terminal with a personal computer is unjustified. When personal computer costs drop to the point where they can compete head-to-head with the high-end terminal market, then more users, not just top executives, will opt to purchase personal computers. This will hold true for a diversified cross-section of industries. But until this time comes, the terminal will remain a viable and needed instrument.

In 1983, International Data Corp., a research firm in Framingham, Mass., determined that 1.78 million CRT-based terminals were shipped in the U.S. marketplace, as compared with 1.5 million in 1982. Overall, the U.S. terminal market experienced an 18% growth in shipments. These numbers, however, do not tell the whole story. To understand the future of the terminal market, a more comprehensive explanation must be made.

The terminal market is made up of asynchronous and synchronous terminals. On the asynchronous side, often referred to as Ascii, there are low-end, limited-editing terminals and full-editing terminals. On the synchronous side, recognized by the Ebcdic character code, there are three segmented areas: IBM 3270-type, IBM former General Systems Division-type and non-IBM synchronous. The final category, clustered processing, is made up of both synchronous and asynchronous terminals (see chart 1).

Price decline an important factor

Perhaps the most important factor in today's terminal market, in terms of how it affects the end user and vendor, is falling prices. In the past, price was directly correlated to the capabilities of the box. Dumb, low-end terminals typically fell at the bottom of the pricing scale, while full-featured, editing terminals occupied the high end.

The pricing structure changed with the advent of offshore production and technological advances. Not long ago, full-editing terminals carried hefty price tags and were luxury products. Today, they are practically a commodity. In 1983, the low-end Ascii market had only a 10% growth in shipments (see chart 2), while the full-editing market had 30% growth (see chart 3).

The decline of the low-end asynchronous market has caused some of the market leaders to rethink their strategies. Digital Equipment Corp., the leader and standard-setter in the dumb-terminal world, responded to declining sales of the low-end Ascii market in 1983 by introducing an enhanced, cheaper ergonomic terminal line, the VT200. Already, the VT200 has received an overwhelming response from the user world and is on the road to becoming the new industry standard for the full-editing Ascii market, succeeding the VT100, for years the de facto asynchronous industry standard.

Intense price competition in 3270 market

Similarly, the 3270 market has had its share of intense price competition, which has eroded the profit margins of these vendors. IBM, who set the precedence in this market, upset the applecart in March when it made replacements to the mainstay 3278 terminals and 3279 color display. The 3178, 3179 and 3180 are departures from the standard 3278 CRT, and all three represent a new subfamily of low-priced terminals.

IBM's combination of price cuts, more features and fast delivery has raised the pressures in the 3270 market, leaving compatibles little room for maneuverability (see chart 4). Plug-compatible vendors have traditionally offered their products at prices 10% to 20% below those of IBM. As IBM turns more of its attention to the office, these vendors have had to trim their profit margins in order to maintain a presence in the 3270 market. This action has made them more vulnerable than ever.

At the close of 1983, sales for the CRT-based terminal market reached $3 billion. Sales for 1984 look as strong as ever. However, this does not mean that the terminal market has easy times ahead. In addition to capturing some of the terminal market share, micros have caused a great deal of anxiety among terminal vendors, which has led to some hasty business decisions, such as Televideo System, Inc.'s unfortunate jump into the personal computer market. Even more disconcerting are the fierce price wars going on between the compatibles, leading to an inevitable shakeout.

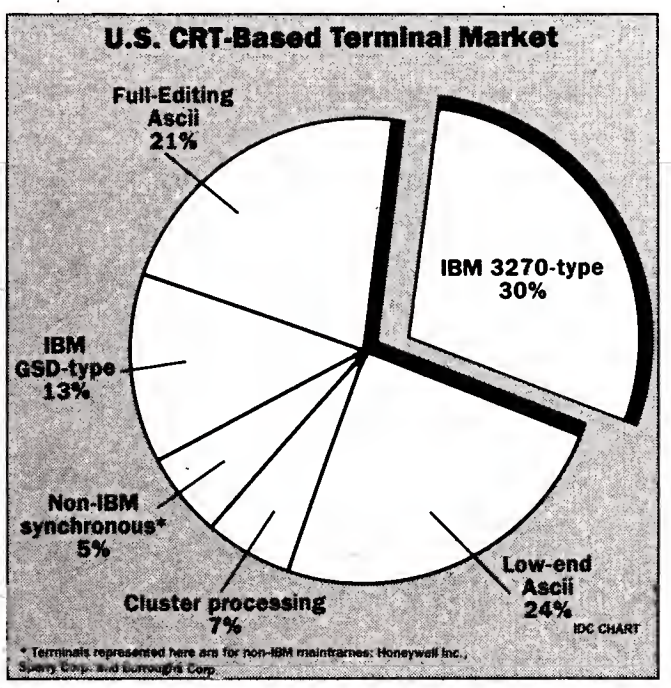


Chart 1. In 1983, vendors shipped 1.78 million CRT-based terminals in the U.S. market. Of these, 45% were low- and high-end Ascii terminals; 48% were IBM 3270-type, IBM General Systems Division-type and non-IBM synchronous terminals; and 7% were clustered processing terminals, including both synchronous and asynchronous machines.

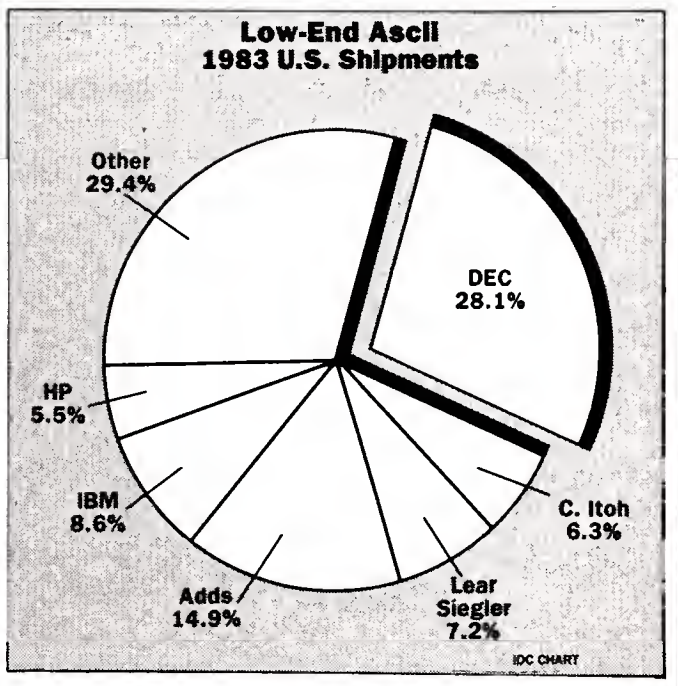


Chart 2. In 1983, vendors shipped 426,850 low-end Ascii terminals, only 10% more than they had the previous year.

Six vendors — Digital Equipment Corp.; Applied Digital Data Systems, Inc. (Adds); IBM; Lear Siegler, Inc.; C. Itoh Electronics, Inc.; and Hewlett-Packard Co. — accounted for 70.6% of those shipments.

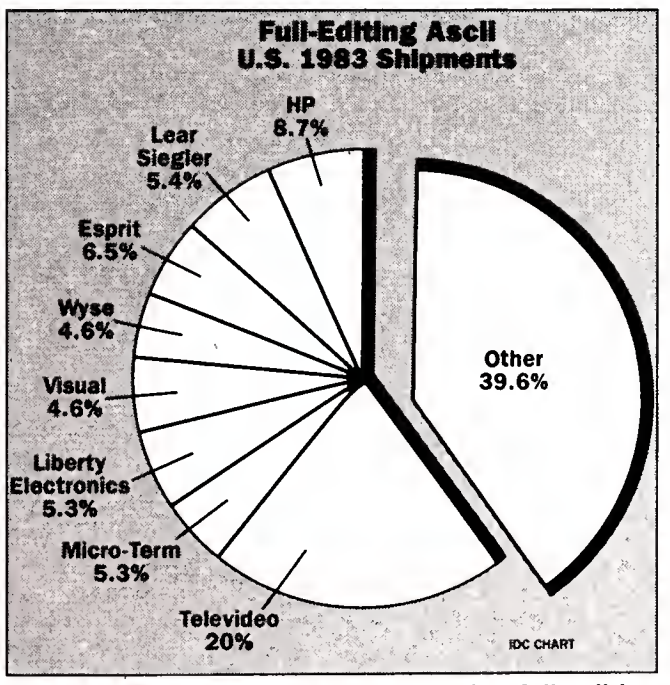


Chart 3. Vendors shipped 379,805 full-editing Ascii terminals in 1983 — a 30% increase over 1982 shipments. Eight vendors — Televideo Systems, Inc.; Hewlett-Packard Co.; Esprit Systems, Inc.; Lear Siegler, Inc.; Liberty Electronics USA; Micro-Term, Inc.; Visual Technology, Inc.; and Wyse Technology, Inc. — accounted for 60.4% of the total shipments.

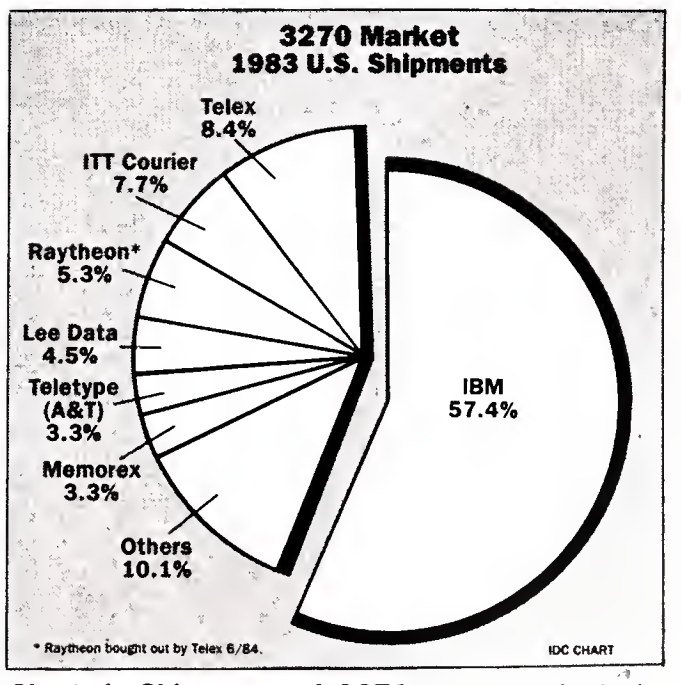


Chart 4. Shipments of 3270-type terminals in 1983 totaled 531,400 machines. Vendors other than IBM accounted for only 42.6% of that number. These vendors — Telex Computer Products, Inc.; ITT Courier Terminal Systems, Inc.; Raytheon Co.; Lee Data Corp.; Teletype Corp.; and Memorex Corp. — accounted for most of IBM's competition in the marketplace.

Goldman is a research analyst specializing in terminals and workstations for International Data Corp., a research firm based in Framingham, Mass.

In battle for terminal, personal computer market

By Joseph Kelly
Special to CW‡

Since deliveries began in 1971, the IBM 3270 Information Display System has become the most successful terminal family in the data processing world. Industry estimates placed the installed base of 3270 and 3270-compatible terminals at well over two million units by the end of 1983.

Out of this impressive base, approximately one-half are terminals manufactured by IBM; the remainder are divided among the several plug-compatible vendors that have populated the market, including Raytheon Co.'s Data Systems Division, Telex Computer Products, Inc., ITT and Teletype Corp. The stiff market competition between IBM and the independents recently caused a small shakeout, with Raytheon (formerly IBM's No. 1 3270 competitor) and Mohawk Data Sciences Corp.'s MDS Trivex Division leaving the market.

But what of the predictions of doom for the conventional 3270 display terminal that have been heard in some quarters? Will the terminals disappear in much the same way as punch cards? The answer here is probably not. IBM's market strategy in 1983 makes this clear.

Until 1983, the 3270 product line changed slowly. The initial components consisted of the 3277 cluster display; 3275 stand-alone display; 3271 and 3272 cluster controllers; and 3284, 3286 and 3288 printers. The second generation of products, introduced in 1977, included the 3278 cluster display, 3276 control unit/display, 3274 cluster controller and 3287 and 3289 printers. In 1979, a significant addition to the 3270 family came in the form of IBM's first color display, the 3279. Many users view the 3279 as the product that legitimatized the color terminal as a business tool.

IBM shook up the market in 1983 with a rash of new products. These products signaled that IBM meant to protect its market share from two industry pressures: the rising popularity of protocol conversion as an alternative to 3270 terminals and the microcomputer onslaught.

The most significant of the introductions were the 3178 and 3180 Display Stations, the 3279 Color Display Station, the 3270 Personal Computer and 3278 and 3279 Personal Computer attachment features. Other new products included a large-screen gas plasma display (3290), a terminal multiplexer (3299) and new versions of the 3274 control unit. In addition, IBM reduced prices for several of the older generation products as a first step in phasing them out. IBM's actions directly addressed the two most significant threats to its 3270 installed base.

The display terminal market in which IBM competes is divided into two distinct and equally large segments: the 3270 synchronous terminal market and the Ascii asynchronous terminal market.

Many users view the 3279 as the product that legitimatized the color terminal as a business tool.

The Ascii market has been, for the past three years, involved in a low-end price war. Prices for basic smart terminals fell below the $500 level, with high-end prices dropping to $1,500. By contrast, the IBM 3278 Display Station carried a single-quantity price of more than $2,000 at the start of 1983.

The protocol converter was introduced during this time. With the advent of the

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How to be in 16 places



share, IBM 3270 product line positioned to survive

protocol converter, Ascii terminals and printers could change their data formats from asynchronous to synchronous, allowing them to transmit to IBM and IBM-compatible host computers. Although the Ascii terminals did not provide all of the functions found on the 3270 terminals, they were significantly cheaper. In some cases the Ascii/protocol converter combination saved costs by as much as 50%.

IBM countered the price advantage offered by Ascii-to-IBM protocol conversion with the 3178. A compact version of the 3278, the 3178 has a purchase price ranging from $1,660 to $1,720 and provides all of the features found on the older model.

In the long run, the most significant area IBM addressed with its product introductions was that of personal computing. The introduction of the IBM Personal Computer in 1981 affected every segment of the DP industry. One of the areas most affected was the display terminal market. As prices for microcomputers fell, many users replaced display terminals with these machines. The classic intelligent terminal has virtually disappeared. Many industry sources predict the same fate for the general-purpose display. IBM, at least for the time being, has shown that it plans to let the microcomputer coexist with the display terminal.

The first moves in this direction came with the unveiling of the 3278 and 3279 Personal Computer attachment features. These options provided the 3278 and 3279 display stations with personal computing capabilities. The products allowed the 3278 or 3279 display and keyboard to be attached to a Personal Computer processor unit.

IBM's key move, however, came with the introduction of the 3270 Personal Computer. The 3270-PC is a version of the Personal Computer that is intended to be used solely as part of a 3270 cluster. Available in color or monochrome versions, the 3270-PC provides the 3270 user with local processing functions as an integral part of the 3270 system. A key feature of the unit is its windowing capability.

IBM also introduced 3270-PC software. Some view the 3270-PC as one step in IBM's long-range plan to make the Personal Computer the universal workstation of its family of computer systems.

IBM made life difficult

The IBM strategy has made life difficult for its competition. The independent vendors have been forced to scramble to keep up with IBM's new products and lower prices. ITT, Memorex Corp., Telex, Lee Data Corp. and many of the other independents have radically overhauled their product lines in efforts to maintain their shares of the market.

Significantly, each of the vendors has added some personal computing capabilities to its terminal systems. ITT provides for the attachment of the IBM Personal Computer, as well as the ITT Xtra and other IBM Personal Computer-compatible microcomputers. Memorex also supports attachments of the IBM Personal Computer. Telex and Lee Data provide their own intelligent workstations or personal computers; Lee Data also provides a workstation that is compatible with the 3270-PC.

At the same time, profit margins have been reduced as vendors have been forced to lower prices on terminals, controllers and printers to meet the new levels set by IBM. Raytheon's Data Systems Division and Mohawk Data Sciences' MDS Trivex Division folded under these pressures. The shakeout may claim more victims.

As for the predictions of doom, for the time being at least, the replacement of display terminals with microcomputers is not economical. In addition, terminals will probably always be needed for basic data entry applications.

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SPECIAL **REPORT**

Multifunction units to expand share of office market

By George Everhart
Special to CW‡

The role of personal computers and multifunction terminals in office information networks will continue to change in the coming years.

Single-function terminals, with their significantly lower prices, have already made an impact on the market. As the technology improves and schemes for improving resource sharing grow, multifunction terminals will take on different roles by tapping the resources within a net.

Industry observers are watching how desktop computers and multifunction terminals coexist today. There is potential in systems that supply both the economy and flexibility of a multifunction terminal with the standalone processing power of a personal computer tied in to a network.

Resource sharing

In applications where data processing needs do not require full-time access to a personal computer, multifunction terminals have proven their worth. They provide resource sharing of personal computer functions, printing, storage and mainframe access.

New technology has given the multifunction terminal more utility. This was done by allowing displays to access different resources on a coaxial local-area network. In some configurations, terminals, when they have access to a multiuser personal computer server, take on the characteristics of a personal computer. Those terminals can also access a cluster controller to communicate with either local or remote hosts.

Although resource sharing is a cost-effective solution for many, it does not solve all problems. At times, users need unshared computing and printing power.

The recent innovation of an interface board that provides a direct channel between an IBM or IBM-compatible personal computer and a local-area network gave personal computer users unshared processing power on their desks while allowing them to share the other resources available online.

Standards must keep pace

As more users accept the combined use of multifunction terminals and multiuser personal computers on a local-area network, industry standards in this area will be forced to keep pace. The IEEE 802 committees have made significant strides in the search for a common industry denominator.

MIS managers, however, cannot afford to wait years for the solutions to their immediate data processing problems. Managers are confused as to the steps they should take to solve their computing needs while the industry decides on its future standards.

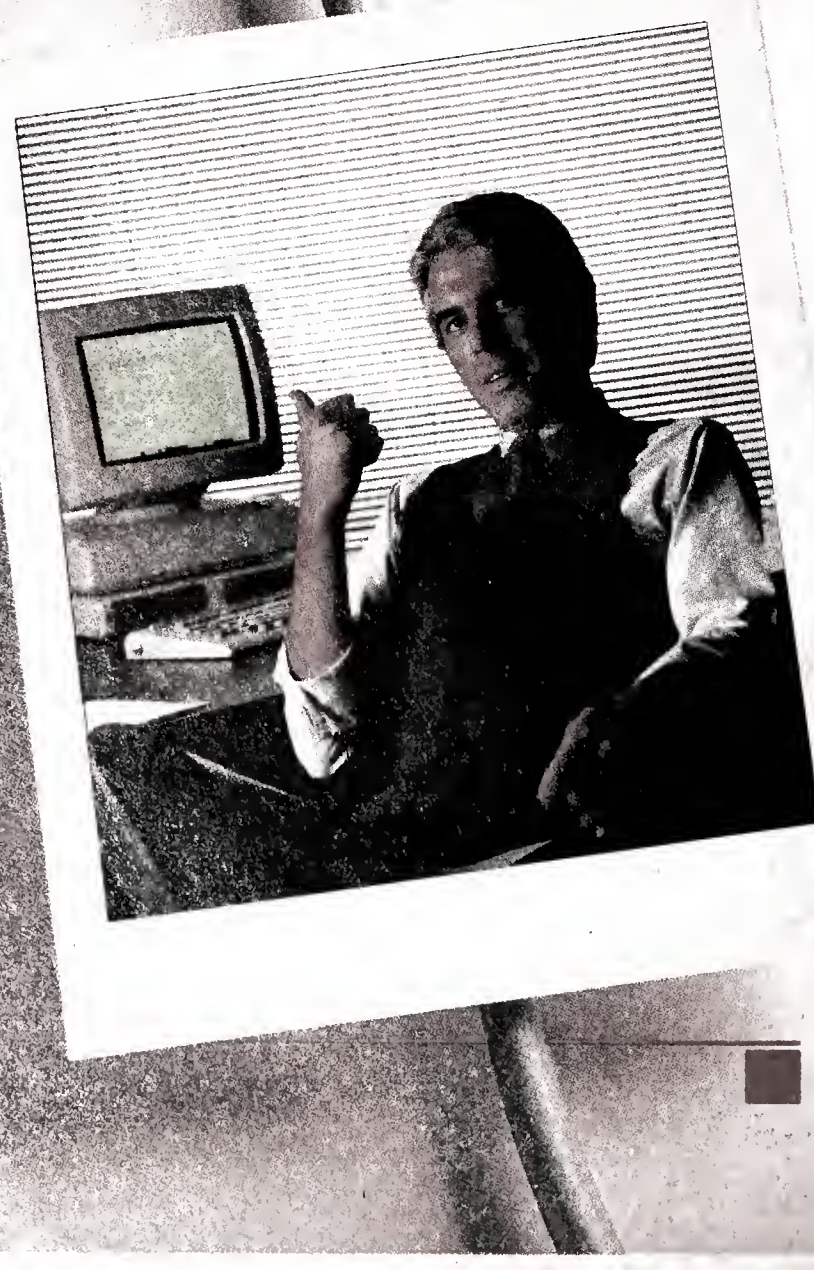
As one solution, some manufacturers have offered resource sharing and local-area network technology using current IBM 3270 coaxial cabling and, where they are in place, gateways to standard local-area networks. This lets users share multifunction 3270 terminals, word processors and personal computers while it saves MIS management from having to make a risky investment in new cable configurations.

If the trend toward sharing resources via multifunction terminals and local-area networks continues, personal computers will be installed only where they are truly needed. There is no reason to install one at every desk. Flexible, multifunction terminals can access communications or applications programs for individuals on an as-needed basis. The terminal will play a dual role in the office information network: that of a personal computer and a data entry/retrieval device.

Everhart is marketing vice-president of Braegen Corp., a manufacturer of data communications terminals based in Milpitas, Calif.

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SPECIAL **REPORT**

Communications network keeps freight firm on track

SAN FRANCISCO — A large international freight forwarder here is using a terminal network as a strategic tool to serve its customers' needs.

At the Harper Group, whose customers include General Electric Co., 3M Corp. and other Fortune 1,000 companies, "data processing is really central to the way the business is run," said Jim Smallman, the firm's MIS director. Smallman reports directly to the firm's president.

The Harper Group maintains an on-line freight inventory system that tracks shipments and paperwork for its clients. Three hundred IBM 3270 terminals and printers in 70 of the firm's U.S. offices communicate over private leased lines with an interactive data base that runs on a 16M-byte IBM 4341 at Harper Group headquarters here.

Nine of the firm's major clients have terminals in their own offices connected over leased lines to the freight inventory system; others tie in to the network through dial-up links. Smaller clients rely on the shipper's branch offices to provide them with information from the inventory system.

'Data processing is really central to the way the business is run.'
— Jim Smallman, MIS director, the Harper Group

Clients can reserve space for shipments on planes or ships and can confirm their reservations immediately through phone calls to Harper Group branch offices that are on-line with the freight inventory system. Customers with their own terminals can prepare and revise waybills for the shipments and transmit them for printing to a Harper Group branch or can have waybills that have been prepared by the Harper Group transmitted to them for printing.

The data base enables the firm to provide its larger customers with analyses of shipping routes and orders to help them identify profitable routes and monitor expenses. Additionally, clients who convince their suppliers to book shipments through the Harper Group can use the IBM 3276 terminals or call a local branch office to get information from the data base about shipment schedules, delivery problems and projected costs.

The data base and terminal network give the Harper Group an edge over its competitors. "Everybody in the industry gets the goods from A to B," Smallman explained, but most U.S. shipping firms rely on manual record-keeping systems and cannot provide their clients with as detailed information as they desire.

"There's a lot of pressure to improve the efficiency of our industry," he said.

One of the reasons for the pressure is that large manufacturers — a group that provides the Harper Group with much of its business — are cutting costs by relying on tight order management rather than high inventory levels to keep their plants stocked with necessary manufacturing components. In turn, shippers must provide highly reliable information about delivery dates for goods, Smallman said. "We have systems designed to do that."

Another reason is that customers have begun to buy parts from vendors who provide them at competitive prices, no matter where the vendors are located, rather than purchasing from one supplier in the U.S. The trend requires freight forwarders to provide information to help their clients track shipments.

"If the customer has a problem with an order, he can't just call the local supplier and have it trucked over," Smallman said. "When you're dealing with Hong Kong, Germany and Korea, it's a much more sophisticated, complex control problem."

Fluctuating international exchange rates have also increased the complexity of the services shippers must provide. Increasingly, he said, Harper Group's customers are determining where they trade on the basis of the changing values of international currencies. As these values fluctuate, customers' trade patterns change, requiring more flexible, responsive service on the part of shippers.

"It all boils down to having good data systems," Smallman said. "The future of this business depends on integrated data networks with widespread international coverage."

Harper Group has used the freight inventory system in its domestic offices for about five years. It designed the system with the intention of expanding it internationally as soon as the technology to do so became available. Smallman said the firm wanted to use the 3270 terminals in an international network, but could not justify the cost of private leased data lines for its overseas offices.

The firm considered using a value-added network connected with an asynchronous protocol, but rejected that option because such a network — running over public telephone lines — lacked the high-speed error-checking capabilities Harper Group

See **FREIGHT** SR/10

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Demand for integrated voice/data tools accelerating

By Sandy W. R. Moore
Special to CW‡

Technology's challenge is to get more functionality into the integrated voice/data terminal's compact package design.

Whether or not a market exists for integrated voice/data terminals is no longer questioned. In the past three years, users have not only accepted the idea of the integrated voice/data terminal, but they are also finding new applications and better software for their use. And what's more important, manufacturers are listening to them.

In early 1984, a number of players, including Rolm Corp., Zaisan, Inc. and Televideo Systems, Inc., announced they were entering what they saw as a high-potential market, while others like IBM, Data General Corp. and Digital Equipment Corp. began making noise about their future participation. With so many players entering the field, it is clear that the market will continue to expand.

The early integrated voice/data terminal market was unstructured and lacked direction. The first integrated voice/data terminal, introduced in 1982, was targeted at the corporate executive.

The principal parties in the early integrated terminal market, Northern Telecom, Inc. and GTE Telenet Communications Corp. were producing voice-oriented devices engineered by voice designers. When the market expanded to include MIS managers and business professionals, manufacturers found themselves trying to sell a voice-oriented integrated voice/data terminal to a DP person. The unit did not meet his needs, so the integrated voice/data terminal market shifted to meet new demands.

Early 1984 was a watershed for both integrated voice/data terminal marketing and technology. Technologically, the emphasis shifted from voice to data. These new terminals had increased access to computer systems and current personal computer-compatible systems that can share fields, software and data simultaneously.

From an applications standpoint, the integrated terminal was no longer strictly targeted toward the corporate executive. It emerged as a tool for anyone looking for ways to improve office productivity.

The integrated voice/data terminal market will continue to expand as more applications are developed. Office workers are finding the voice/data terminal an efficient device. Already, the banking industry is a big voice/data terminal user. At Citibank, for example, employees use these terminals with an 81-number directory to call up key customers or data bases. While talking to the customer, they can scroll necessary data onto the screen.

Doctors use voice/data terminals to access medical data bases for information on new drugs and drug incompatibility, while lawyers use them to tap law data bases for research or recent court decisions. The trucking industry, too, is finding these terminals useful, relying on combined voice and data devices to keep track of pickup, delivery and general disposition of loads.

New uses will progress logically to accounts receivable, purchasing and expediting functions. When a seller, using a voice/data terminal, can scroll up who owes money, automatically dial and then talk to the person, efficiency is increased.

Or, consider the telemarketing industry. With a voice/data terminal, the seller can call up information on a particular client, telephone that client and say, "Our records show you last ordered this product and that data. Do you need to reorder?" The possibilities are endless.

The market will also expand as users begin to appreciate the differences between the voice/data terminal and the personal computer. Voice/data terminals cost less than a personal computer, and while most micros are single-station units, through hardware and software combinations a single IBM Personal Computer can become a multiuser system. In addition, the voice/data terminal offers an element of security control in the office that is sometimes lost through personal computer usage.

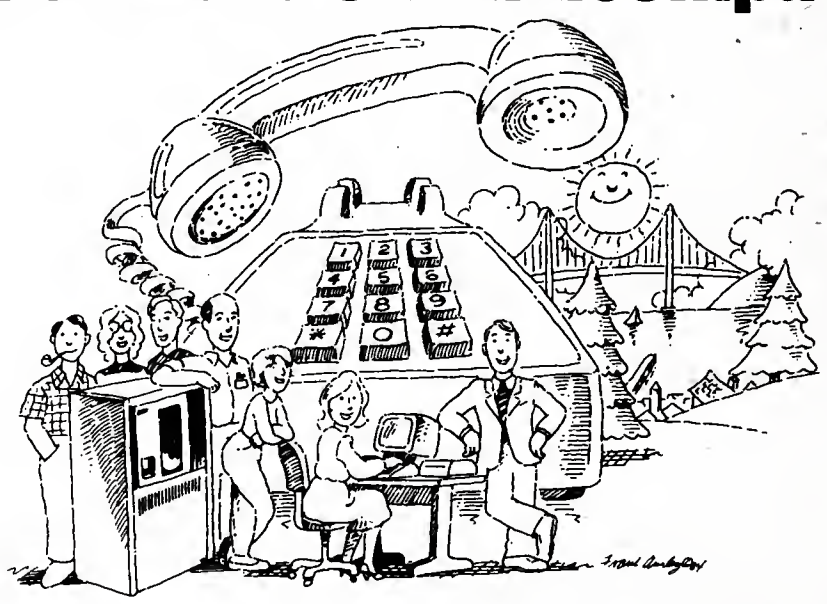
As the integrated voice/data terminal market expands, user preferences will occur. Currently, standalone voice/data terminals — those that can be used with key systems, private branch exchanges (PBX) and central office lines — have a market edge. But in the near future, perhaps the 1985-86 period, proprietary voice/data terminals, those that op-

See VOICE SR/11

Moore is vice-president, terminals, for Northern Telecom, Inc., a maker of integrated voice/data terminals.

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40 Wholesale/Retail Trade
50 Business Service (except DP)
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65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
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60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
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3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
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Net processor credited with uniting bank's protocols,

JACKSONVILLE, Fla. — Until recently, the commitment a bank here made to use specific terminal equipment — regardless of its communications protocol — saddled the bank with an abundance of leased telephone lines and an overabundance of monthly bills.

Atlantic National Bank of Florida, a statewide institution with 110 branch offices and $3.4 billion in total assets, purchased terminals from different vendors to suit its varied needs. "We like to buy the best terminal to fit the job," according to W. J. Cole, Atlantic's vice-president for operations.

The bank used three types of terminals, which operated under three different communications protocols and utilized different transmission speeds:

'We like to buy the best terminal to fit the job.'

— W. J. Cole, vice-president of operations, Atlantic National Bank of Florida

■ TRW Corp. Teller Assist terminals, which allowed tellers to mark up checks and perform inquiries about customer balances. Atlantic's branch banks operated about 1,100 Teller Assist machines. The machines communicated asynchronously at a rate of 1,200 bit/sec.

■ IBM 3270-type CRT terminals from Memorex Corp., Harris Corp. and other vendors. The branch banks operated about 350 CRTs, which communicated using IBM's 3270 bisynchronous protocol at 2,400 bit/sec.

■ Diebold, Inc. 910 and 911 automatic teller machines (ATM). Atlantic's branch banks had a total of 180 ATMs, which used bisynchronous protocols to communicate at either 2,400 or 4,800 bit/sec, depending on volume.

"Because of the different protocols and different line speeds, we ran three leased lines from each of our branches," Cole said. Atlantic spent about $100,000 per month on leased telephone lines over which branch banks communicated with headquarters.

Last year the bank helped Datamaxx USA Corp. develop a host-independent network processor to solve the problem of different protocols. The Communications Management Device (Command) takes inputs from a variety of devices and outputs a signal that Atlantic's front-end processor and host read as IBM 3270 bisynchronous protocol. Atlantic finished installing Command in its branch banks in August.

Cole said use of the units allowed the bank to cut the number of leased telephone lines running from each bank branch from three to one, without changing the terminal configurations at its branches. Atlantic now saves 30% to 40% — between $35,000 and $40,000 per month — in leased-line charges, according to Cole.

Data from the Teller Assist, CRT and ATM terminals at Atlantic's branch banks goes through the Command unit and is transmitted 9,600 bit/sec over a leased line to one of Atlantic's 18 Tandem Computers, Inc. Nonstop II front-end processor nodes.

The nodes, located at one of four regional communications centers, feed the communicated data to the bank's mainframe, a 16M-byte National Advanced Systems, Inc. AS/9050, at its headquarters here.

Besides allowing Atlantic to save

FREIGHT from SR/7

wanted, Smallman said. "You've got to have fully error-checked protocols when you're moving the kind of financial and technical data we are."

He said the firm chose to wait for a more reliable means of connecting its international offices to its information network.

Immediate purchase

This year, Computer Sciences Corp. began offering a value-added network with an error-checking high-speed bisynchronous protocol and virtual circuits. "When that became available, we got it immediately," Smallman said.

The Harper Group will bring offices in London, Hong Kong and Sidney, Australia, on-line this month over the value-added net. Branch offices in Japan, South Africa and Germany are scheduled to go on-line by March.

According to Smallman, in the future, the company may install dedicated leased lines in some foreign offices if business volumes increase enough to justify the expense of the lines.

With the foreign Harper Group offices' current volume, dedicated lines would cost about five times as much as the value-added network, Smallman said.



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cutting costs

money, the processor also gives the bank more options when it looks to buy new equipment. Before it installed the Command units, Atlantic required new equipment to have a protocol that matched one of the three already in use, Cole said. "Now we don't have to worry about that anymore."

The Command unit allows data that communicates over standard communications systems to be transmitted over the single phone line that runs out of each branch bank, so restrictions on new equipment are minimal, Cole said.

Each command unit includes a CRT terminal from which analysts can run diagnostics on the system. The terminal also provides on-line access to information in Atlantic's mainframe. Cole said this feature allows small branch banks that could not justify the cost of a CRT terminal for on-line use to purchase a terminal that allows both access and communications savings.

Each Command unit costs Atlantic $6,000, including the CRT terminal. Atlantic receives a discount from Datamaxx because it helped develop the unit and it buys in volume. Per-unit prices for the unit range from $6,000 to $8,200, depending on configuration and number purchased.

Atlantic has equipped all of its bank branches with Command units and has installed 120 of the network processors.

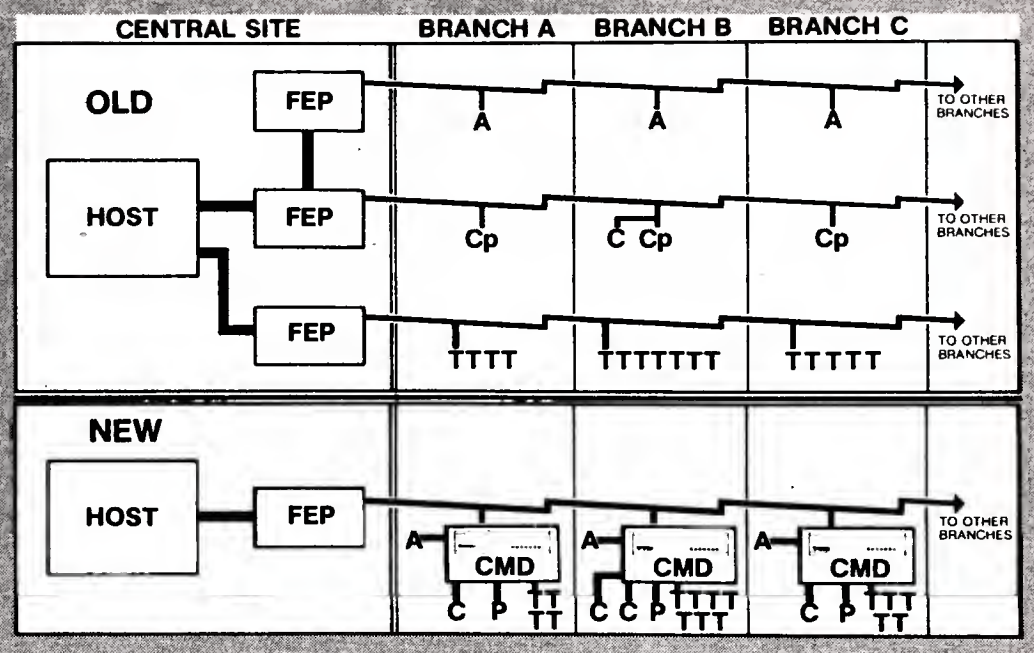
The bank keeps about 10 spare units in storage in case operating units break down in the field. Cole said the bank saves time by installing the spare units, rather than waiting for repairs. When a faulty unit has been replaced with a working one, Datamaxx repairs the broken machine, and Atlantic puts the repaired unit in storage to serve as a replacement machine later.

Before, after

Under the bank's former network (above), each branch office ran three communications lines to three front-end processors on the host.

The host-independent network processors that the bank installed allowed it to cut by one-third the number of communications lines and front-end processors (below).

Key
FEP — Front-end processor
T — Teller terminal
C — CRT terminal
Cp — CRT terminal and printer
A — ATM
CMD — Command unit



VOICE from SR/8

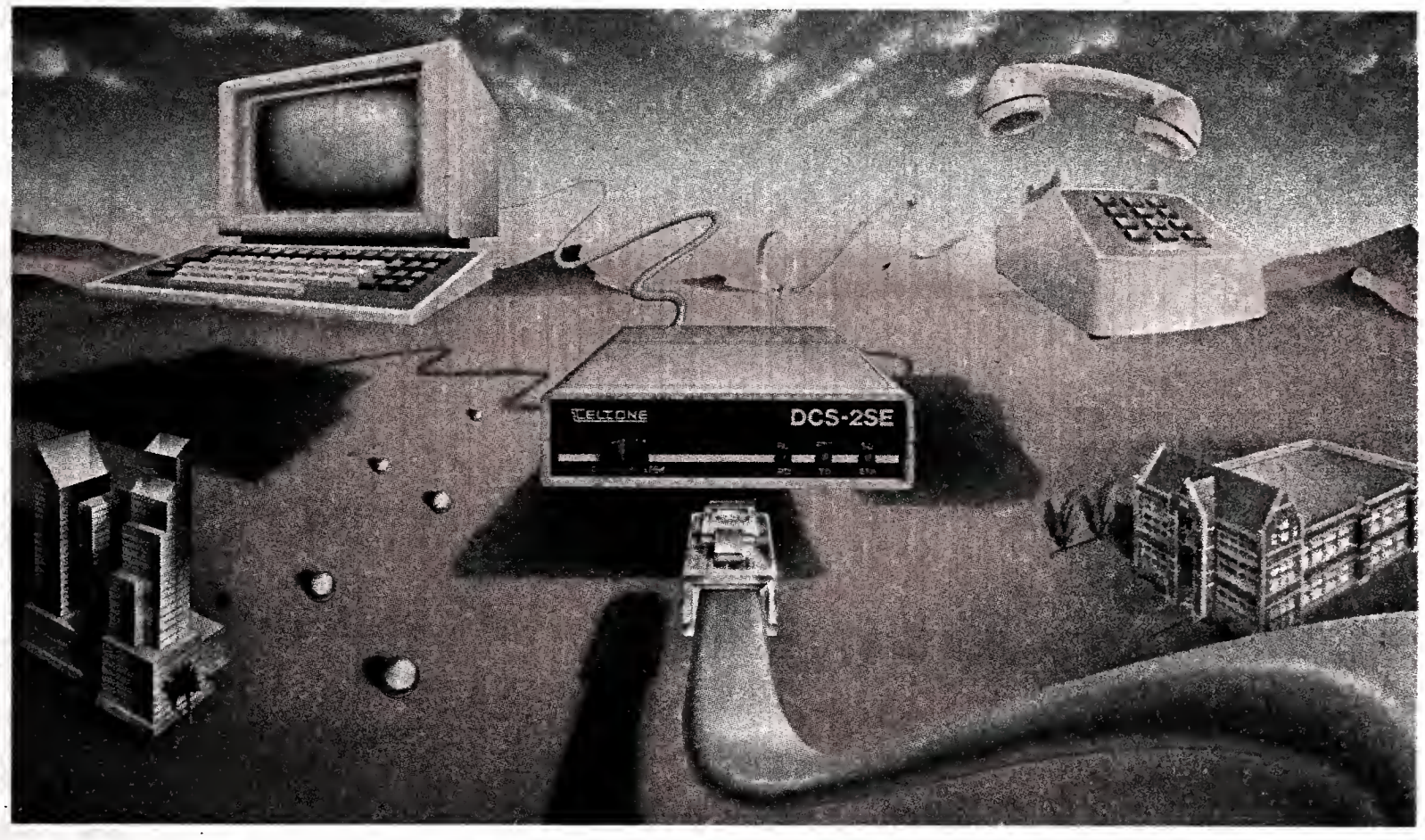
erate, for example, with a Rolm or a Northern Telecom PBX, will see a greater market edge. This will be partly because of the potential for messaging systems.

By 1987, the market will likely shift back to stand-alones, provided the technology does not slow down and integrated voice/data terminal prices decrease. By then, manufacturers will be able to put more processing power and other features into a smaller space and reduce heat and ventilation problems. Technology's challenge is to get more functionality into the integrated terminal's compact package design.

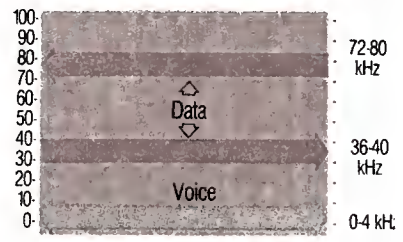
The marketing challenge for the future will be to find new integrated voice/data terminal applications. Those industries that deal with renewals, such as insurance, and the general consumer market can benefit from integrated terminal applications. The market has proved that users will pay over $1,000 for these terminals. Manufacturers must lower that figure for users who will want to use electronic mail systems and to tap into a wealth of data bases.

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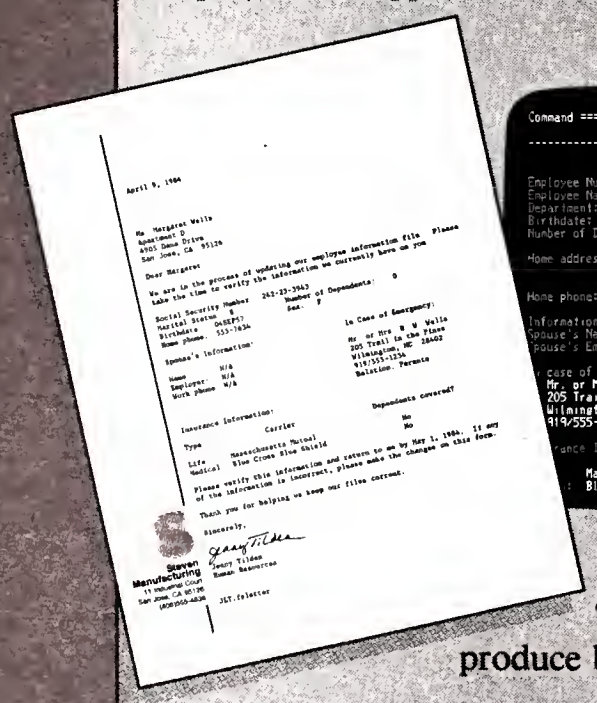
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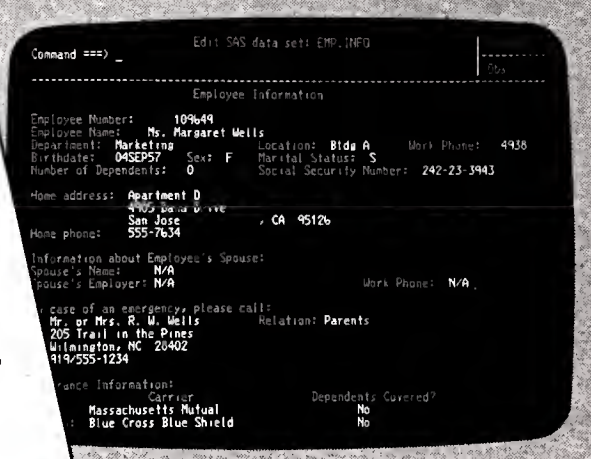
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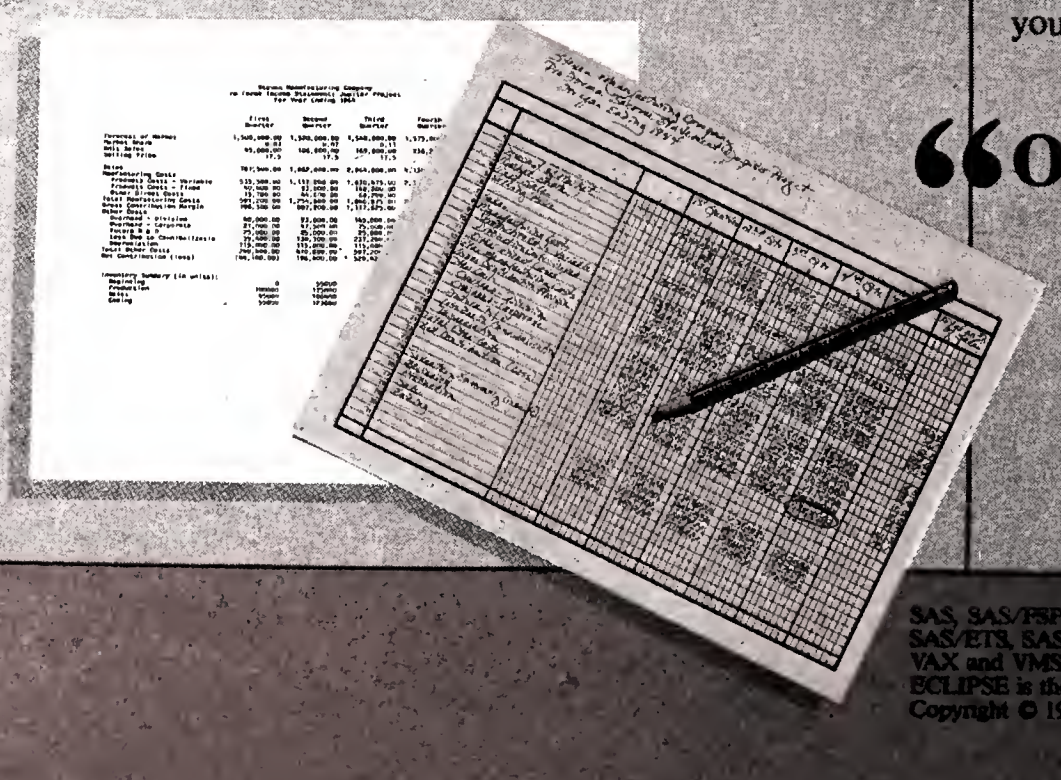
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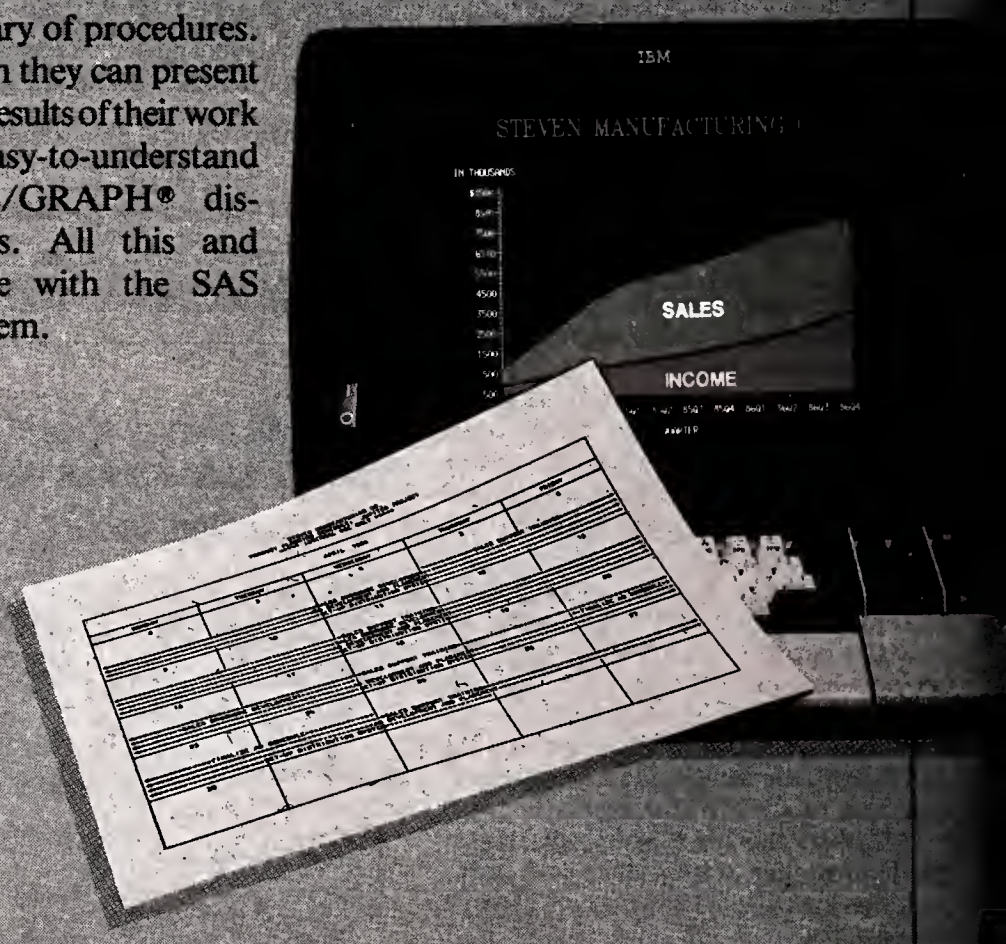




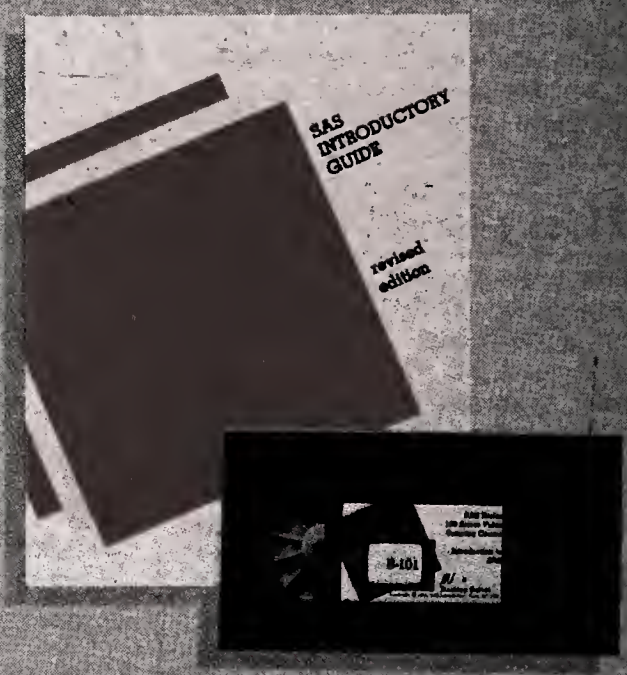
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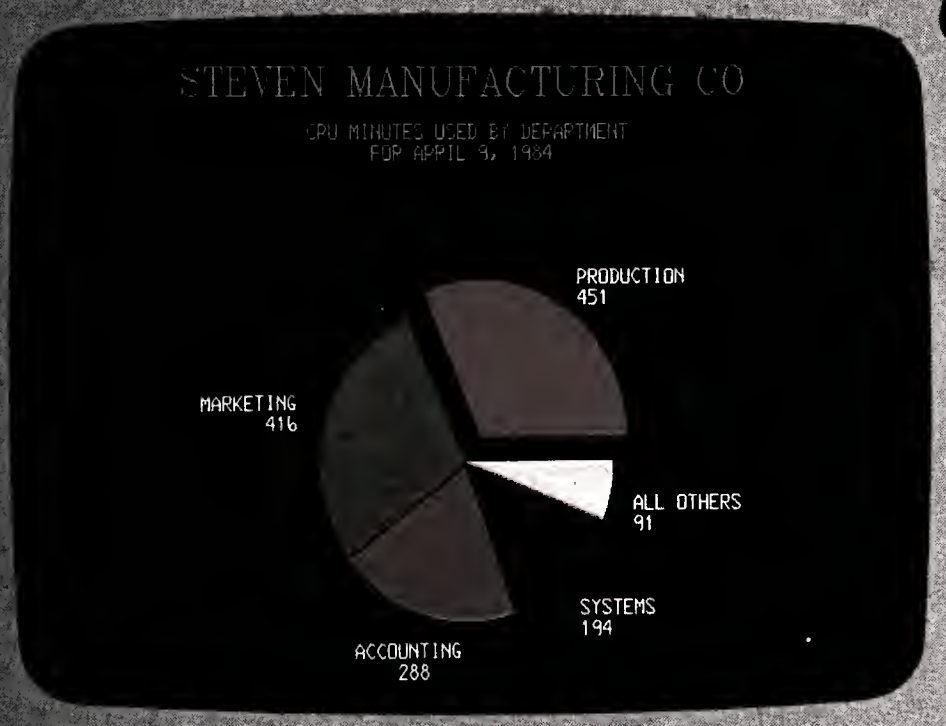
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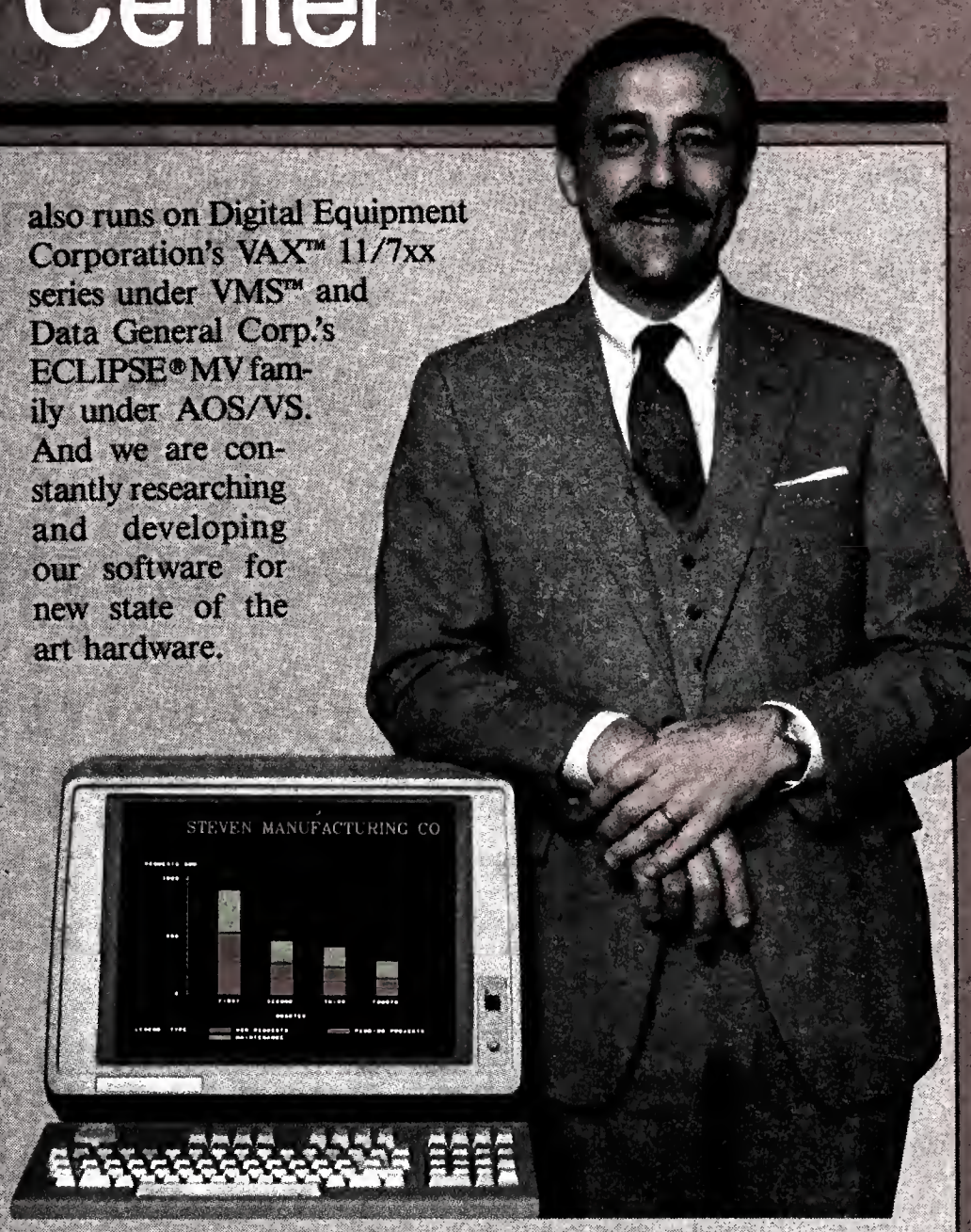
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VSE SYSTEM USAGE BY DEPARTMENT
FOR APRIL 9, 1984

		CPU MINUTE			I/O COUNT	
		NUMBER OF EXECUTIONS	SUM	MEAN	SUM	MEAN
DEPARTMENT	JOBNAME					
ACCOUNTING	JACCT110	3	31.32	10.44	11372	3791
	JACCT210	7	38.97	5.57	34968	4995
	JACCT220	8	103.95	12.99	74237	9280
	OTHERS	25	113.76	4.55	56065	2243
HUMAN RESOURCES	OTHERS	16	31.00	1.72	50374	2795
LEGAL	OTRERS	16	17.00	1.06	8218	514
MARKETING	JMRTG170	3	31.35	10.45	13557	4519
	JMKTG200	9	145.36	16.15	159131	17681
	JMRTG215	8	82.33	10.29	43748	5469
	JMKTG220	7	67.01	9.57	132357	16908
	OTHERS	21	89.95	4.28	100880	4804
PLANNING	OTRERS	17	43.00	2.53	27479	1616
PRODUCTION	JPROD200	12	80.47	6.71	107271	6939
	JPROD500	7	170.00	24.29	69020	12717
	JPROD650	4	56.35	14.59	91561	22690
	OTHERS	24	142.18	5.92	108352	4515
SYSTEMS	JSYS525	4	38.47	9.62	22519	5630
	JSYS620	4	24.62	6.15	39212	9803
	JSYS700	4	47.36	11.84	41780	10445
	JSYS850	4	49.67	12.42	40256	10064
	OTHERS	17	33.88	1.99	114291	6723
ALL JOBS		222	1440.00	6.49	1366608	6156



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SPECIAL **REPORT**

Software lets firm keep track of leases, anticipate bills

NEWPORT BEACH, Calif. — When an equipment upgrade forced the data center of an insurance firm here to take a hard look at its equipment accounting practices, it found them lacking.

"We really had no idea how much book value was left on certain items, which items were purchased and which were leased, where we stood on investment tax credits and what the various components of the data center were really costing us per month to operate," said George Beveridge, an independent consultant on retainer for Pacific Mutual Life Insurance Co.

During its equipment upgrade in 1982, Pacific Mutual brought in a 24M-byte IBM 3081 to replace two National Advanced Systems, Inc. machines. It has since added peripheral components, and the firm's data center now includes about 400 Lee Data Corp. terminals, including 1216s, 1230s and 1220s; seven IBM 3287 and 3289 terminals; and other equipmment.

PACIFIC MUTUAL

The 400 Lee Data terminals, with their associated controllers and keyboards, represent at least 900 discrete components.

The firm realized it would have to change its accounting practices to keep track of financial information for all these components.

Beveridge said few item-by-item records had been kept on equipment in the old configuration after it had been acquired. Record keeping had been turned over to accounting, which handled it according to corporate financial needs.

On the books, components were grouped in categories that were too general for the data center's accounting needs.

He began looking for a network management software package that would allow Pacific Mutual to manage finances for the equipment in the new system. He decided on Netman from California Software, Inc. because it offered the financial capabilities the data center needed and features for tracking components. Pacific Mutual installed Netman in early 1983, shortly after installation of the new hardware.

The software package tracks information such as vendor, terms of the contract for lease or purchase, maintenance contract details, date of order, delivery and installation.

Pacific Mutual leases its Lee Data terminals from a third-party lessor and has been ordering about 25 new terminals each month.

Because the firm enters data on new leases when it orders equipment, rather than when it installs them, it can anticipate what lease invoices it will receive in any given month, Beveridge said. When invoices arrive, the data center staff checks them against expectations and notes any discrepancies.

Keeps track of money

Beveridge said this capability is important for Pacific Mutual because it has leases on hundreds of terminals and controllers. If the firm loses track of the money it has agreed to pay for this equipment, it cannot check whether its vendors are billing it according to contract specifications, Beveridge said.

For the IBM terminals, Pacific Mutual uses the package to monitor its credit accruals toward purchase. Beveridge said that credits maximize at 50% of the purchase price. Netman's monthly reports list where the IBM accruals stand, and when they approach 50%, the firm decides whether to purchase the terminals. If the terminals will be in use for a while, purchasing generally makes economic sense, he said.

Pacific Mutual also relies on the package to keep track of contract expiration dates, investment tax credits on its terminal leases and internal chargeback to user departments.

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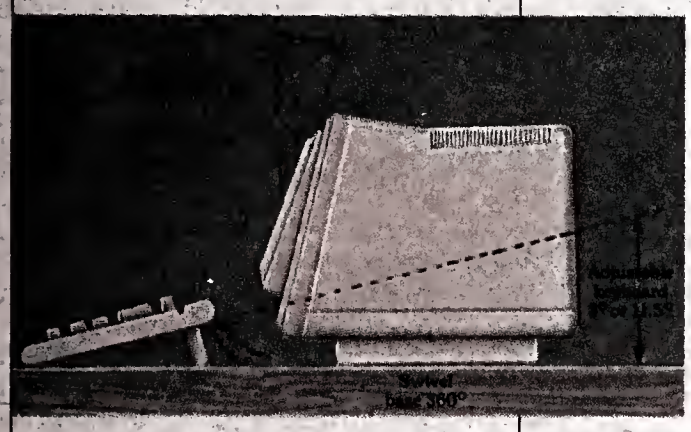
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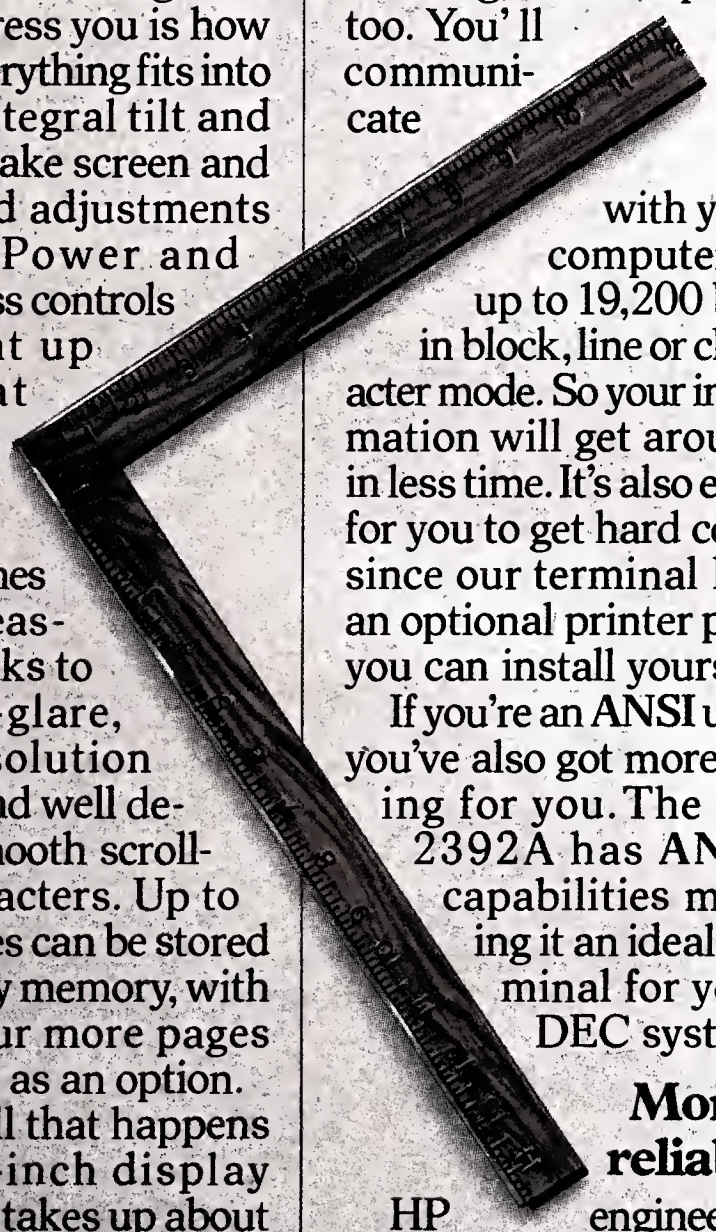
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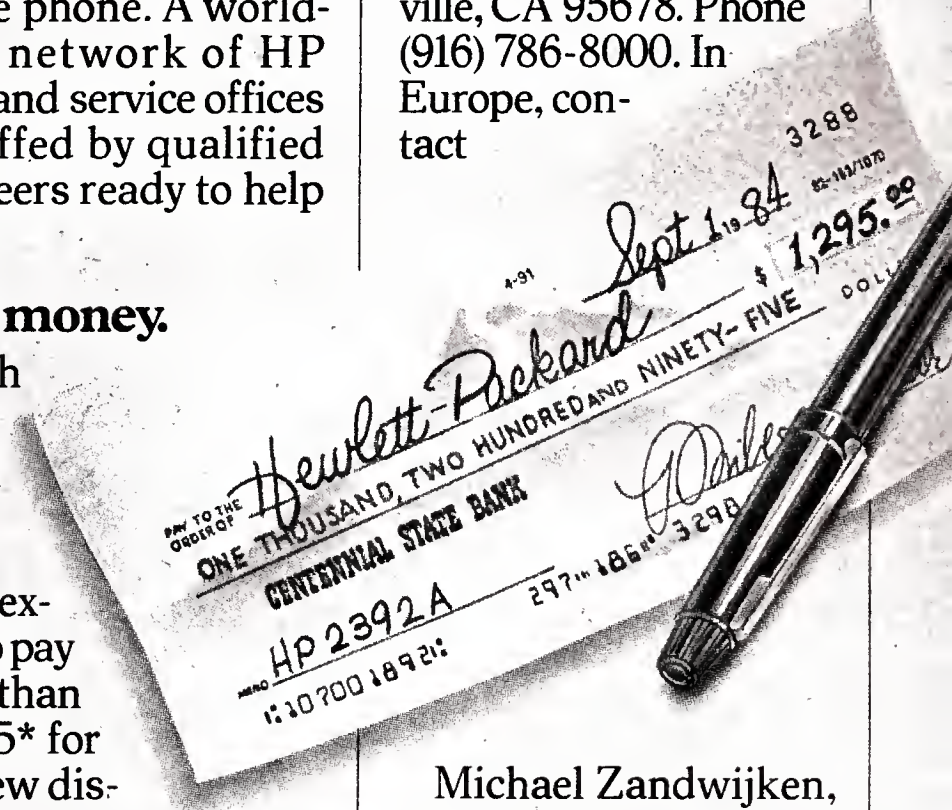
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BD02423

Purchasing gear need not cause terminal headaches

By Jack R. Rule
Special to CW‡

Determining a company's data processing needs was once the domain of the MIS or central DP department. This is not so today. Today, managers at the local departmental level are often faced with the task of selecting the hardware and software that will meet their departmental needs.

How does a manager with little experience in purchasing hardware and software, in this case terminals, cope with the myriad systems choices that are currently on the market? One key fact to remember is that five types of terminals will be needed for the office of today and tomorrow:

Tomorrow's workplace will require office machines that communicate easily with each other and that are compatible with any data base.

- Dumb terminals.
- Word processors with access to personal computers.
- Terminals with graphics capability.
- Terminals that combine the previous three categories.
- Computer-aided design and manufacturing systems that can interact with all the above categories.

There is a rationale behind this selection of terminals: It does not make sense to put expensive data terminal equipment, such as a personal computer, on every desk. If the application calls for a dumb terminal (for inventory control, for example) or a dumb terminal with a personal computer attachment (for a manufacturing application), then these terminals should be used.

Tomorrow's workplace will require office machines that communicate easily with each other and that are compatible with any data base. Departments will be custom-tailored by managers using a combination of equipment and software resources. Furthermore, staff will be able to communicate data, voice and video pictures from their individual terminal workstations. Equipment will be easily expandable.

Presently, terminals are available that go a long way in this direction. Some current models are capable of accessing many sources of information, including multiple mainframes. To manage data flow, local-area networks have been developed that use gateways to allow terminals to access data base sources. Local-area networks are now available that allow up to 500 data processing devices, including those manufactured by different vendors, to communicate with each other. Trends are moving toward fully integrated and expandable offices that let users access information from any office.

Today's local department manager has more responsibility and has assumed an important role in office automation. The manager's decisions can make a vital difference in company productivity and market share.

Local managers assumed the responsibility for equipping their offices slowly as DP became less localized and the demand for full OA increased. Also, as software packages emerged that made applications development by the nontechnical user possible, it became clear that the department that was going to be using the application software should have the final decision over its purchase — not the MIS manager.

It should come as no surprise, however, that some department managers accepted these duties with discomfort. Many had relatively little experience with the sophisticated technology.

In the early days of the first mainframes, the task of managing a company's automated resources resided in the hands of an army of central DP gurus, about whom the rest of the company knew little. At that time, DP configurations were fairly inflexible. The mainframe performed maintenance and updates on data as well as the heavy-duty processing.

In those days, most terminals were dumb, asynchronous types, which could only accept information and perform light analysis functions. Productivity boosters that we take for granted today like real-time, online processing and multitasking were unknown. The mainframe was used to process scheduled jobs consisting of large amounts of raw data. End users typically received the processed results of their work at month's end.

Defining and implementing application programs and finding the hardware that could run these programs, as well as planning the allocation of resources for the future, was

See **GEAR** SR/19

Rule is a senior product manager for Racal-Milgo, Inc., a manufacturer of data communications terminals based in Sunrise, Fla.



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Bargain net helps DP staff get system on-line on time

By Raymond Bugg
Special to CW‡

ARDSLEY, N.Y. — Starting from scratch, the data processing shop at a division of Ciba-Geigy Corp. acquired terminals and a communications network for a newly acquired plant in Delaware and brought them on-line with the corporate data center here within about three weeks, in time to transmit data on its first day of operation under its new owner.

The data processing shop, the information systems department of Ciba-Geigy's Plastics and Additives Division, managed the speedy setup even though the equipment it had deemed necessary for a communications link between the plant and the firm's data center arrived a month and a half after the acquisition took place.

The solution that allowed the information systems department to accomplish its task was an interim communications network that cost the firm only $3,000, plus communications line costs.

The Plastics and Additives Division of Ciba-Geigy develops a range of specialized industrial products, such as chemical and light stabilizers. Its information systems department consists of a small staff of consultants, which elicits assistance for specific projects from Ciba-Geigy's corporate data processing shop, the management services department.

Ciba-Geigy's corporate data center here, located approximately 10 miles from the division's headquarters in Hawthorne, N.Y., maintains a 12M-byte IBM 3033 that the division accesses through remote job entry and a 24M-byte IBM 3081 Model K that it accesses via an on-line, real-time 3270 network. The mainframes provide CICS, TSO and IMS facilities.

On Dec. 15, 1983, the information systems department learned that Ciba-Geigy Plastics and Additives was contemplating a business acquisition. Ciba-Geigy's corporate management had signed a letter of intent to acquire a portion of the E. I. DuPont De Nemours & Co. organic pigments business.

The acquisition was to include the Delaware plant, which would continue its role as the primary source of product production. The final agreement date was to be sometime during the first quarter of 1984.

The acquisition was to include only one piece of the plant's hardware — a Hewlett-Packard Co. HP 3000 — and no operational systems for inventory management and other critical applications. The plant had operated a manual inventory and pricing system, and its staff was unfamiliar with on-line technology.

Yet the division needed applications to be up and running on the first day of postacquisition operation to minimize any disruption in customer services and production processes and to maintain data as accurately as possible on the new product line.

Once the acquisition was imminent, the management services department developed the definition and scope of the project to link the plant with Ciba-Geigy's data center and assembled an acquisition team. The project team consisted of members from several of Ciba-Geigy's corporate MIS departments who took responsibility for application development, hardware procurement and installation.

An analysis by the team determined that the newly acquired business should, whenever possible, be incorporated within divisional and corporate systems. In line with this plan, the team decided to reconfigure the HP 3000 to provide a remote job entry link to the data center's 3033 and to install a leased-line 3270 network to provide access to CICS and the Plastics and Additives Division's order entry and inventory system, which ran on the company's 3081.

For accessing the 3081, the team chose a network consisting of IBM 3270 equipment — one 3276 display controller and four 3278 CRT terminals — which would access the division's host processor via leased, private data lines.

In February, a final acquisition date of April 12 began to surface, and the team placed orders for the hardware and communications lines.

But Ciba-Geigy's Telecommunications Group, which held responsibility for equipment acquisition, pointed out to the project team that the targeted installation dates for the ordered hardware and data lines were in jeopardy: The projected ship dates for the IBM equipment fell more than a month after the acquisition date, and the AT&T divestiture caused delays in the installation of the data lines.

With the assistance of the Telecommunications Group, the project team established criteria for a viable setup the division could use until equipment and lines for its permanent system arrived and could be installed. The following were the criteria for the interim setup:

- It should be a 3270 look-alike to reduce the need for redundant training once the permanent environment was in place.
- It should consist of easily installed, off-the-shelf equipment because of the time frame.
- It should also be as inexpensive as possible because the effort would represent a short-term solution.

With these criteria in mind, the Telecommunications Group recommended the use of a dial-up terminal that would allow 3270 emulation.

The corporate data center had a Protocol Computers, Inc. (PCI) 1076 protocol converter resident on its 3081 mainframe, and the Telecommunications Group advised the project team to use an associated terminal, the PCI Networker Terminal, as the dial-up 3270 look-alike.

The Telecommunications Group ordered all the required equipment and received it within a matter of days. The interim configuration consisted of:

- Two PCI Networker Terminals, chosen because of their resemblance to the 3270s the firm had on order.
- Two Penril Corp. 212A 1,200 bit/sec modems, chosen because they were available immediately.
- Two direct nondata business telephone lines. Ciba-Geigy chose the nondata lines because they could be installed within 10 days after they had been ordered. The 9,600 bit/sec data lines the firm had ordered for its permanent configuration required a 100-day waiting period from order to installation.

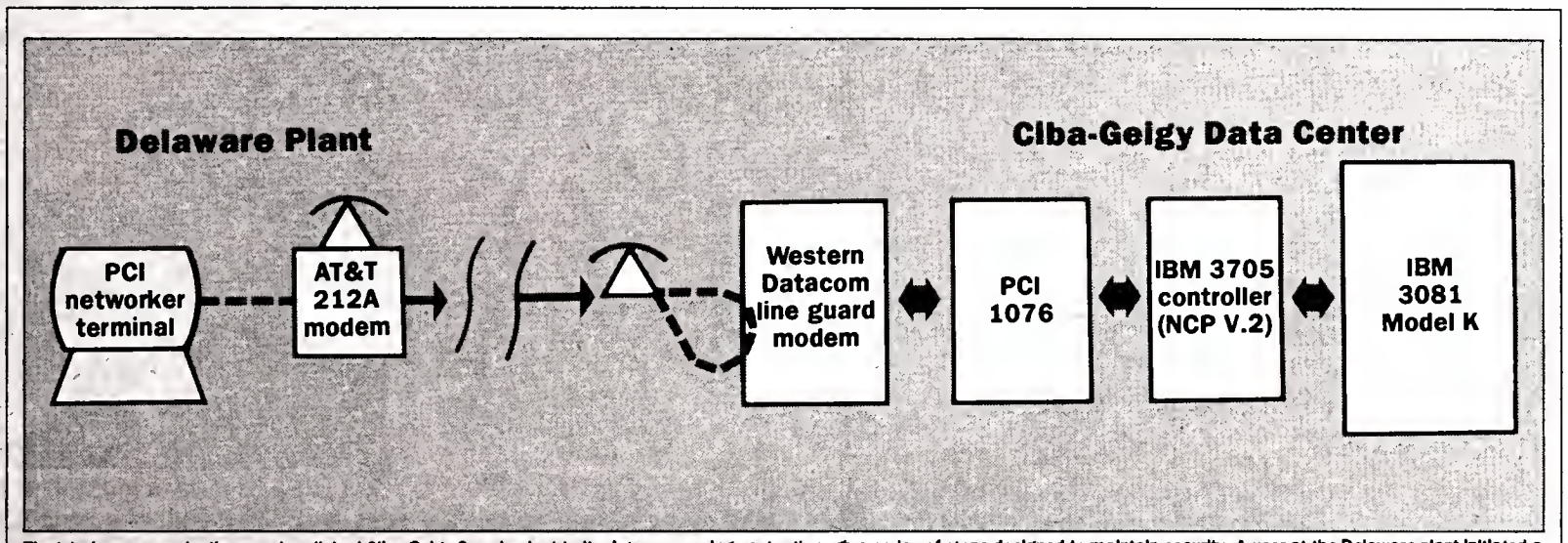
Within three weeks of the decision on the interim processing setup and about a week before the acquisition date, the configuration was up and running. The interim configuration resulted in a totally functional off-site operation that met the targeted acquisition date.

On April 12, the plant's first day of operation under Ciba-Geigy management, the facility sent data on inventory levels to the division's mainframes.

By June, the permanent leased data lines had been set up and the IBM terminals installed. The information systems department replaced the interim network with the permanent one.

The PCI Networker Terminals are now being used by some of Ciba-Geigy's technical employees as home terminals that tie in to the corporate mainframes.

Ciba-Geigy' Plastics and Additives Division plans to include the use of the PCI Terminals in future acquisition plans.



The interim communications system linked Ciba-Geigy Corp.'s plant to its data processing center through a series of steps designed to maintain security. A user at the Delaware plant initiated a voice telephone call to the data center via one of two direct business lines attached to the Protocol Computers, Inc. (PCI) I Networker Terminals. A Western Datacom Co. Line Guard modem at the data center received the call and issued a password request to the user, who entered his password on the terminal. If the password was accepted, it caused a line disconnect and initiated a callback to the user's predefined business line. When the callback was completed, the Line Guard modem passed control to the PCI 1076 protocol converters, hooked to the data center's IBM 3081 Model K through an IBM 3705 controller running IBM's Network Control Program Version 2. The protocol converters allowed IBM 3270 emulation, giving the user access to applications that resided on the host.

Bugg is a senior systems consultant with Ciba-Geigy Corp. at the firm's Hawthorne, N.Y., plastics and additives division.

Interim network makes installation a hookup away

In the installation and disassembly of its interim network, the Information Systems Department of Ciba-Geigy Corp.'s Plastics and Additives Division disrupted operations at its newly acquired plant as little as possible.

Because employees who would use the planned network were unfamiliar with on-line technology, the department sent staff members to the plant to serve as teachers during the installation of the interim system. Users of the interim network's Protocol Computers, Inc. (PCI) terminals also had access to on-line training courses running on Ciba-Geigy's corporate mainframes.

Marietta Smith, a senior control clerk at the plant, said she learned to use the PCI terminals in less than a week, and she praised her teachers for the way they introduced her to the technology.

Smith said she enjoyed entering inventory information on the terminals rather than logging it on paper as she had done before the acquisition by Ciba-Geigy.

When the interim system was replaced with the permanent one, Smith needed no training on the IBM 3278 that replaced her PCI Networker Terminal. She said the operations and the keyboard layouts of the two machines were similar. The transition to the permanent system did not disturb her work at all, she said. "We just unhooked one and we had the other."

SPECIAL **REPORT**

Expanding ATM networks draw consumers' interest,

By Robert W. Mahoney
Special to CW‡

Our financial delivery and payment systems are radically changing. The rapid growth of electronic funds transfer (EFT) has been spurred by the consumer acceptance of automated teller machines (ATM), the growth of shared ATM and EFT networks and the proliferation of credit and debit cards.

In the near future, consumers will use ATM debit cards and self-service terminals to buy fuel for their automobiles, obtain coupons electronically for discounts on brand name merchandise, buy airline tickets, buy tickets to sporting events and concerts and even buy lottery tickets.

The customer will use an ATM debit card, which interacts with a terminal on-line to a data base, to pay for groceries at the supermarket, to purchase items from electronic catalogs and even to receive government benefits such as food stamps, aid to dependent children and unemployment compensation.

By the end of 1983, over 40,000 ATMs were in use across the U.S. More than 100 million ATM debit cards are now in consumers' hands. They are used to perform more than 3.4 billion transactions a year. These transaction numbers are projected to reach 10 billion annually by the year 1990.

The future scenario for ATM debit and credit cards includes automated ticketing to purchase transportation, entertainment and gaming tickets. Currently, Avis Rent-A-Car Systems, Inc. uses transaction terminals for its automated Avis Rapid Return service, letting customers return cars and receive a printed record of expenses.

Avis plans to extend that program to "Rapid Rental," wherein the customer can make reservations, receive a finalized contract and learn the parking location of the rented car by using a self-service terminal.

Self-service technology also offers the potential to automate government benefits distribution.

The distribution costs of government welfare programs are increasingly expensive. Studies conducted in several states revealed that the distribution costs for unemployment checks is $2 to $5 for each check; welfare checks are $7.50, and food stamps are $1.75 to $3.00. Couple these costs with transaction volumes that range from 150,000 to 200,000 per month in Arizona to 3.5 million to four million per month in New York, and the magnitude of this problem becomes more visible.

Add one more dimension to these numbers. There are 10.5 million people in this country receiving welfare benefits, 22.7 million on Medicaid and 21.6 million receiving food stamps. Both ATMs and point-of-sale (POS) terminals can reduce the costs of check dispersal and reduce fraud, which is a major problem with today's distribution system.

Perhaps a more current ATM issue is the growing number of joint ventures between financial institutions and retailers.

Today, there are approximately 245,000 convenience stores and gasoline stations. These locations are suited for self-service EFT devices because they are fast-service operations and many are open 24 hours a day. As a result, many large chains are installing direct debit scrip terminals, cash dispensers and automated fuel systems that allow customers to pay for their gas and convenience items either by cash, debit or credit card either at the island through an automated fuel system or in the store with a POS terminal.

Island fuel terminals operate like the ATM. Automated fuel systems control fuel delivery and pricing as well as payment.

Cash dispensers are becoming popular with retailers who have high customer traffic. Why cash dispensers and not full-service ATMs? Facts indicate that cash dispensers are more cost-effective in this environment because of their lower purchase price and service costs.

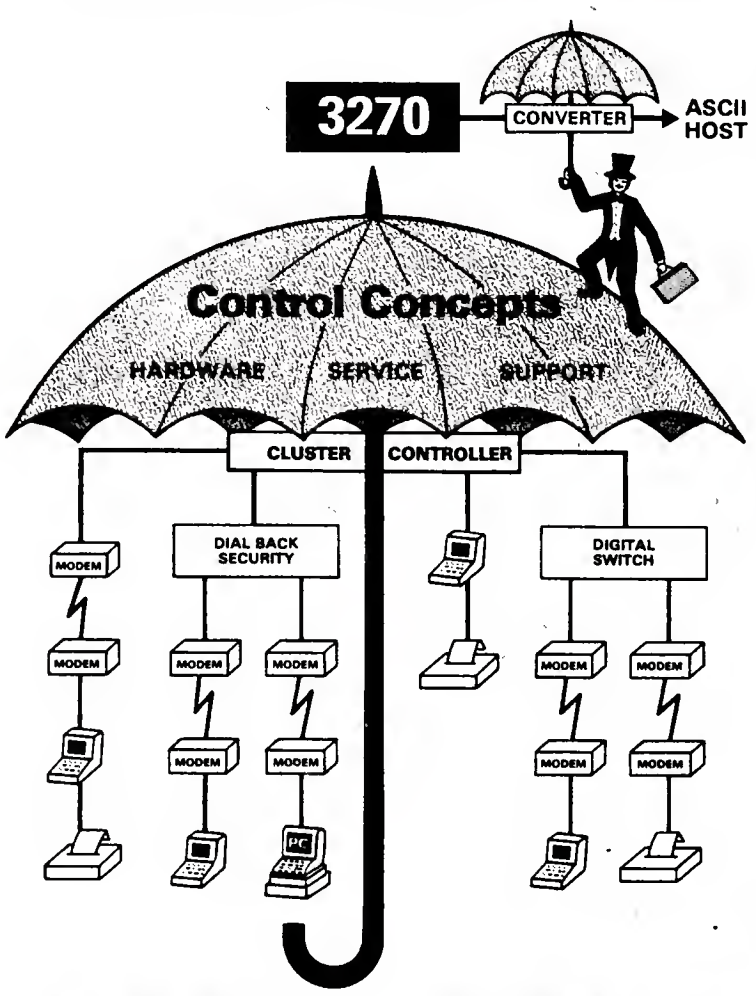
The 29,000 supermarkets now in the U.S. are



Using an ATM, Avis customers that are returning cars can automatically process their rental agreements and receive a record of charges without talking to a rental agent.

Mahoney is president and chief operating officer of Diebold, Inc., a Canton, Ohio, manufacturer of automated teller/electronic funds transfer machines.

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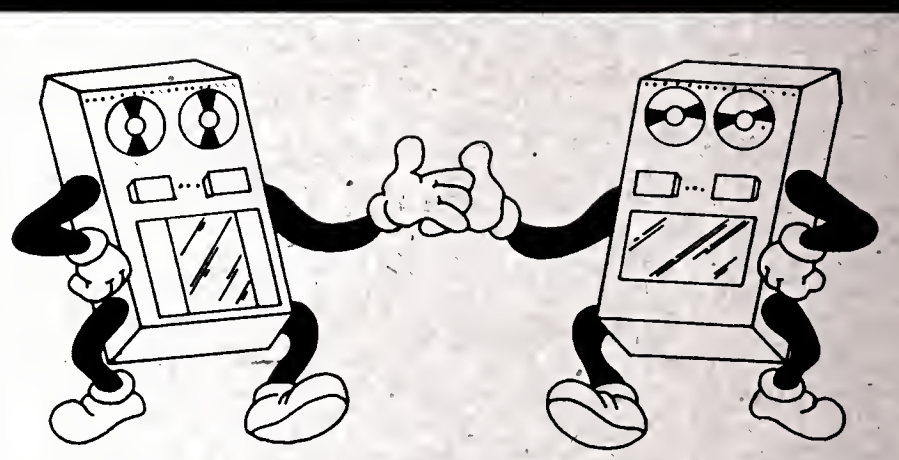
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Another possible use of ATMs in the future is the placement of direct debit and check/credit authorization terminals in specialty stores within shopping centers. These networks would broaden the base of automated payment services and produce communications cost savings.

Clustering ATMs, cash dispensers and other payment terminals in a kiosk at the supermarket entrance, for example, in addition to preauthorization of debits, would allow a user to get cash, make a deposit, pay a bill, transfer money, authorize a check, obtain cents-off coupons and purchase items from an electronic catalog. The same system would provide the retailer with electronic security, access control and energy management systems for the store.

These self-service applications could double the projected annual ATM transaction levels to 20 billion transactions by 1990. If these assessments are correct, and some experts believe they are conservative, we are rapidly approaching a self-service, transaction-driven society.



This round-the-clock, consumer-operated fuel dispensing system can be activated by debit or credit cards.

GEAR from SR/16

a trial-and-error procedure for the DP department. Fortunately, vendor firms were involved in the process.

Despite the liabilities associated with early DP, user demand for system access steadily grew. Mainframe systems were overloaded as more lines were fed into the system. At the same time, operation and maintenance costs escalated. As work backed up, it became clear that a new configuration was needed between computer and terminals to make DP more cost-efficient.

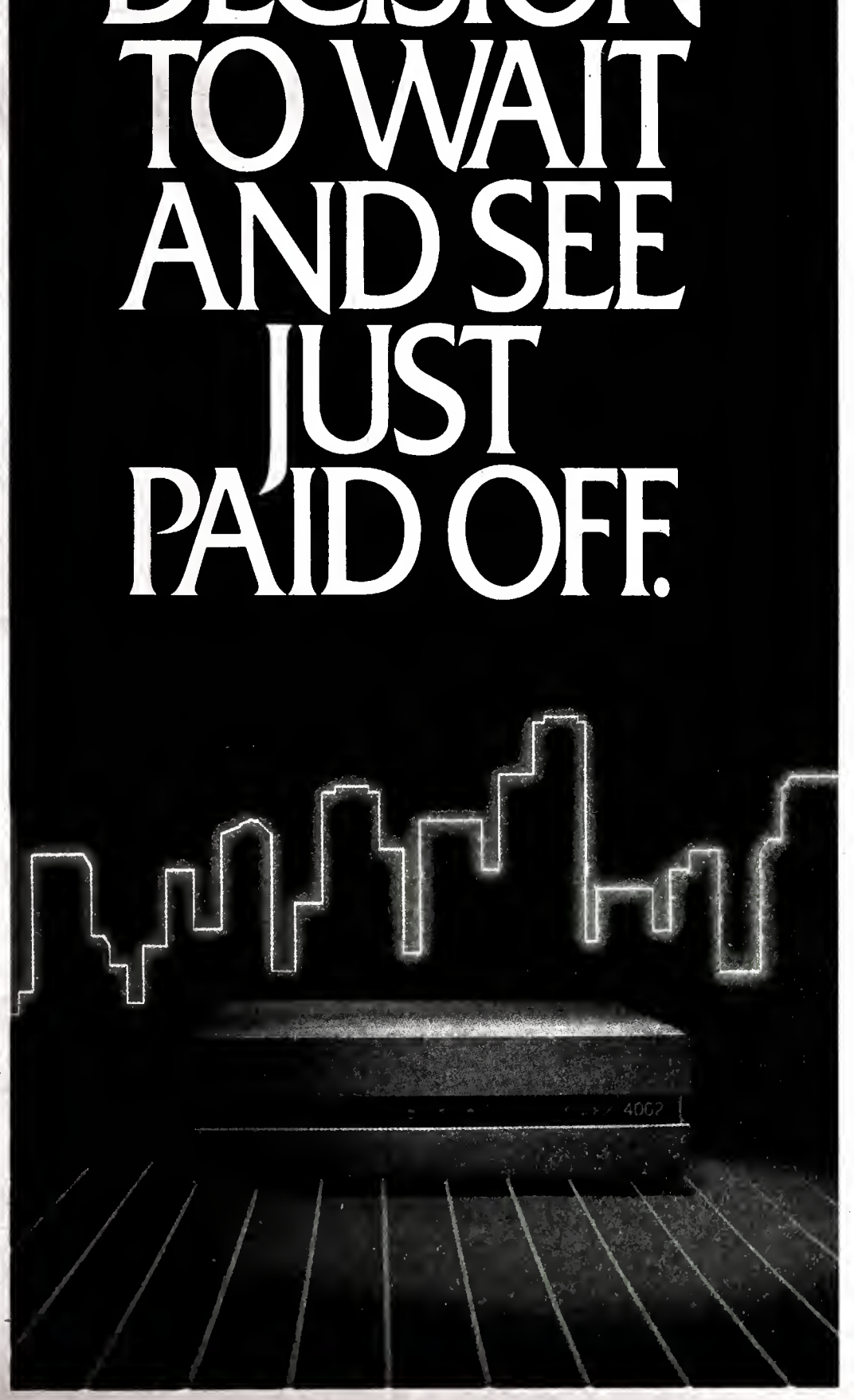
The temporary solution was the distributed clustering of terminals to the minicomputer. This off-loading of the mainframe meant that not only could current work be done, but also that more users could access the system. As the number of users accessing the system grew, however, the resulting traffic problem produced exorbitant communications line costs and once again overloaded the host system. More complicated applications and higher application costs continued to add to the MIS manager's work load.

A better solution was a flexible synchronous terminal that saved transmission costs by capturing current data from the mainframe or mini and processing it right on the terminal itself.

Synchronous terminals became a cost-effective way to get work done. As more and more nontechnical users sought computer experience, user-friendly technology mushroomed. This development went hand in hand with across-the-board demands for flexible, tailored applications. And, invariably, as soon as a new application was developed by MIS, the local department manager requesting the application found one more task for MIS to fulfill.

The introduction of faster data speeds, multitasking, data integrity, shared data base information and on-line computing further broadened the appeal of new technology. Office automation was well on its way. Today, many local department managers are solely responsible for seeing that the department needs are met.

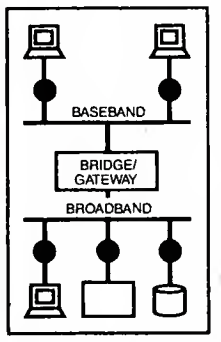
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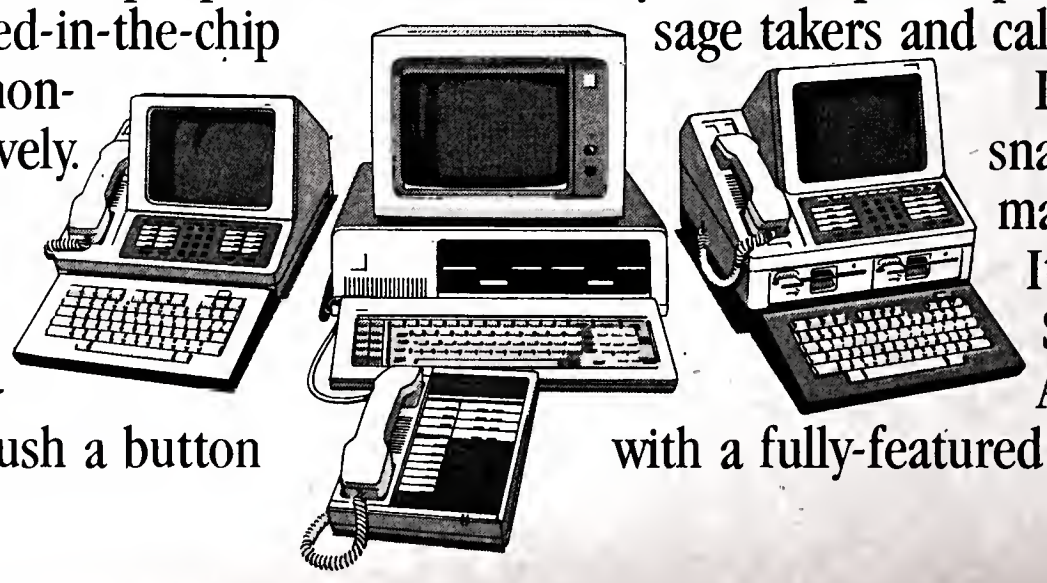
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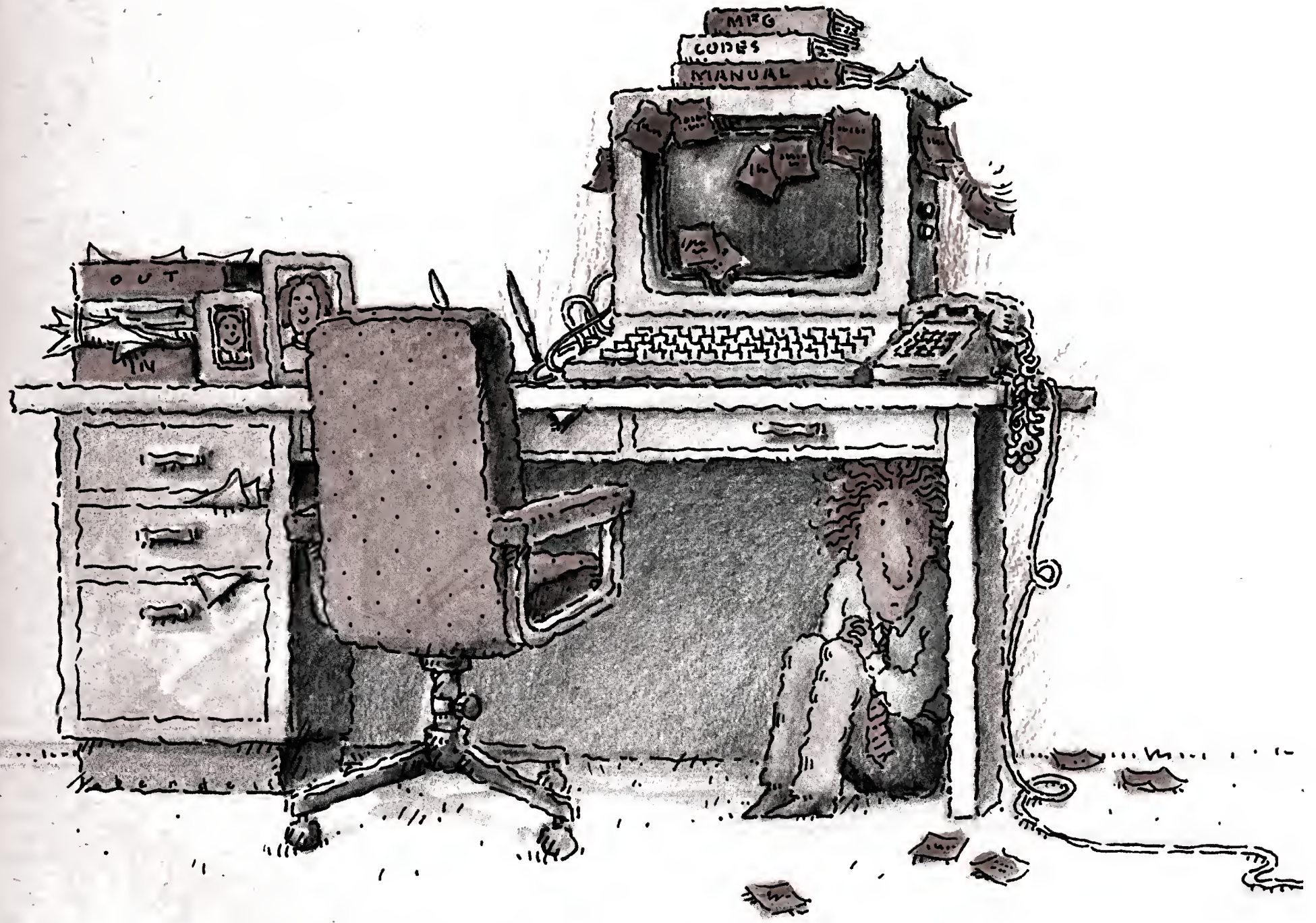
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Migration path from VDTs key in agency's choice of micros

ALBANY, N.Y. — When users at New York's largest state agency here began asking for personal computing power, their data processing center gave it to them without giving up the advantages of a terminal system that was already installed.

The New York State Department of Mental Hygiene consists of the Office of Mental Health, the Office of Mental Retardation and Developmental Disabilities and the Division of Alcoholism and Alcohol Abuse. It is the largest government employer in New York, with about 70,000 employees, and has an annual budget of more than $2.7 billion.

The data center that oversees operations for the entire department, the Information Support System (ISS), has for two years operated a network of 440 IBM 3270-like terminals — mostly Mohawk Data Sciences Corp. (MDS) 2192s and some other VDTs from Racal-Milgo, Inc., Raytheon Co., Memorex Corp. and IBM.

Terminals in the network are controlled by 187 MDS Series 21 distributed processing systems. The network is linked over bisynchronous data lines to an 8M-byte IBM 4341 and a 12M-byte Honeywell, Inc. DPS 8/70.

Agencies within the department use the terminal system to maintain patients' medical histories and to trace drugs that are administered, so as to prevent the possibility of adverse interactions.

The department also keeps track, through the mainframe data base, of the $800 million in billings it sends out annually for its health care.

George Syrett, director of technical services and systems operations for ISS, said providing users with access to such mainframe data is crucial. "I don't believe people are islands," he said. "They have to connect."

When users asked for personal computing power, ISS chose MDS Hero networked personal computers over other products, chiefly because the machines could provide a migration path from the current network.

He explained that just about any box can provide desirable personal computing abilities, but that none but the Hero allowed the department a convenient migration path from its terminal system.

ISS installed 85 Heroes this spring and plans ultimately to link them and other Heroes it has ordered to the mainframes over private leased data lines and to eliminate the Series 21 controllers. But the switch to the private lines will take about two years, in part because of AT&T's line installation backlog.

"Part of our problem is that we can't get telephone lines, so we can't get a network," Syrett said. ISS is relying on the Series 21 migration path to pull it through the interim.

It is working to tie some of the Heroes into the terminal-mainframe system through the Series 21 controllers. A Zilog, Inc. Z80 chip in the Series 21 switches the Hero's asynchronous transmissions to bisynchronous so the information can travel to the mainframes over data lines.

Mainframe access

"The MDS Hero accesses the mainframes' host computing resources and data bases, allowing users to interrogate the data locally then integrate it into an MDS Hero application," Syrett said. This gives users the freedom of a [personal computer] and the power of the mainframe."

Four Heroes currently access the mainframe as 3270 look-alikes through a drop network. The machines are fitted with emulation software that makes them appear to the IBM and Honeywell mainframes as 3276s.

Until they can be linked to the network through the Series 21s or through the permanent data lines, most of the other machines will serve as stand-alone systems for word processing, for spreadsheets and for evaluating different health programs.

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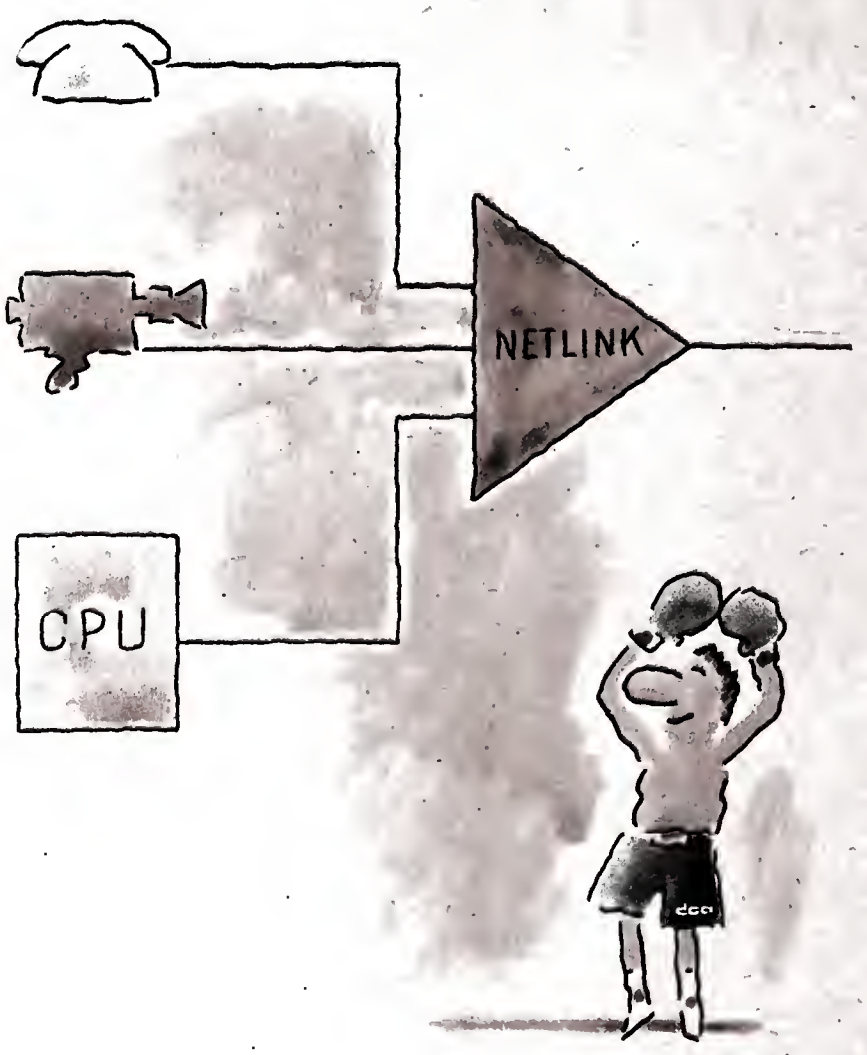
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SPECIAL **REPORT**

Wise terminal makers will heed end-user demands

By Allan Maurer
Special to CW‡

The times are changing for VDT suppliers. The rapidly maturing end-user market is demanding more than a dumb box and is looking increasingly to multifunctional, interactive desktop devices and personal computers for its data processing and communications needs. The trend is definitely toward smart.

Demand for personal computers and intelligent workstations continues to grow at an astounding rate. An estimated 25.5 million personal computers will have been sold in the U.S. by 1987, according to a prediction by Dataquest, Inc. The demand for conversational and editing terminals is also growing, but much more slowly. Approximately 5.5 million such terminals will be installed by 1988, according to a study by Advanced Resources Development, Inc.

What all this means is an increased demand in the next five years for systems rather than terminals. CRT terminal suppliers will either have to branch out to satisfy workstation needs or become casualties of the inevitable shakeout in the terminals market.

The terminals market is not faltering, however. Personal computers cannot answer all the needs of business systems users. The two factors that will favor the growth of terminal products are cost and the need to disperse information and functions among a number of workers. But it is clear that the market must adapt.

The largest segments of data entry terminals comprise three distinct groups of equipment and represent 63% of the domestic data entry terminal base: Editing CRT terminals (IBM 3270-type compatible) have roughly 24.5% of the overall market; conversational CRT terminals represent about 23% of the market; and editing CRT terminals of the non-IBM 3270 type have about 15.5%. These numbers exclude key-to-storage-oriented units that represent approximately 3% to 4% of the overall data entry market.

A growth rate of 69% is expected in this market by 1988 with growth expected in these three areas:

- 25.9% in 3270-type editing terminals.
- 23.4% in non-3270-type editing terminals.
- 19.2% in conversational terminals (representing a 4% drop in share).

Clearly, the non-3270-type editing terminals will show the strongest growth, with conversational terminals taking a drop.

The increasing use of business graphics points to growth in the graphics terminals market as well. A study by Venture Development Corp., based in Wellesley, Mass., shows a projected 29.9% compound annual growth in dollar shipments of graphics terminals. Inexpensive raster-scan graphics displays will no doubt have the lion's share of the market, provided a high resolution is offered. In the meantime, graphics terminals continue to offer smaller suppliers a means of competing with larger, more established firms.

Some producers of terminals have tried to find a new profit niche for themselves in the personal computer market. The danger, of course, is in entering a market that is chock-full of competition and one that is already dominated by a few of the big guys who leave little room for others The diversion of energies and resources from terminals manufacturing and marketing to computers can be a fatal drain. The workstation and intelligent terminals market represents a more effective course for a terminal producer to take.

Industry studies indicate that by 1988, the market will be dominated by devices designed specifically for workstation functionality — true management workstations. The proliferation of workstations is attributed to several cited trends. Among them is the increasing availability of multifunction, interactive products. The ease with which components can be integrated and interchanged, particularly with the emergence of the Ansi communications protocol.

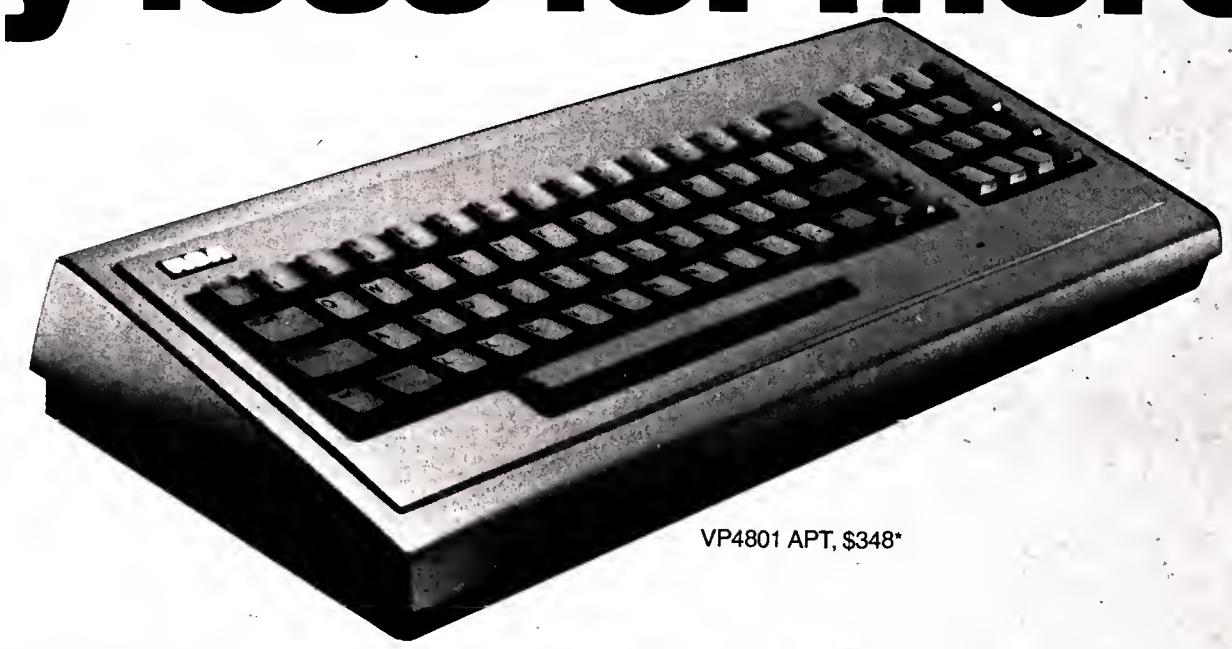
Advances in technology have increased performance to such a point that intelligent workstations can now be adapted to virtually any application. Fewer compatibility barriers and emerging standards will make it easier to choose a multiuser system over a personal computer.

An additional factor that cannot be ignored is the new awareness on the part of the end user that these technologies can be useful at all levels of office operations.

This new, aware market will find terminals with local intelligence and graphics attractive. Word processors that are multifunctional and supermicros such as the IBM Personal Computer AT and others have increased the options for communications and expansion. Small systems in particular, with easily integrated components and software supporting a number of users with different needs, should continue to be a significant portion of the multiuser mart.

Maurer is the vice-president/marketing for Esprit Systems, Inc., a manufacturer of graphics and data communication terminals based in Melville, N.Y.

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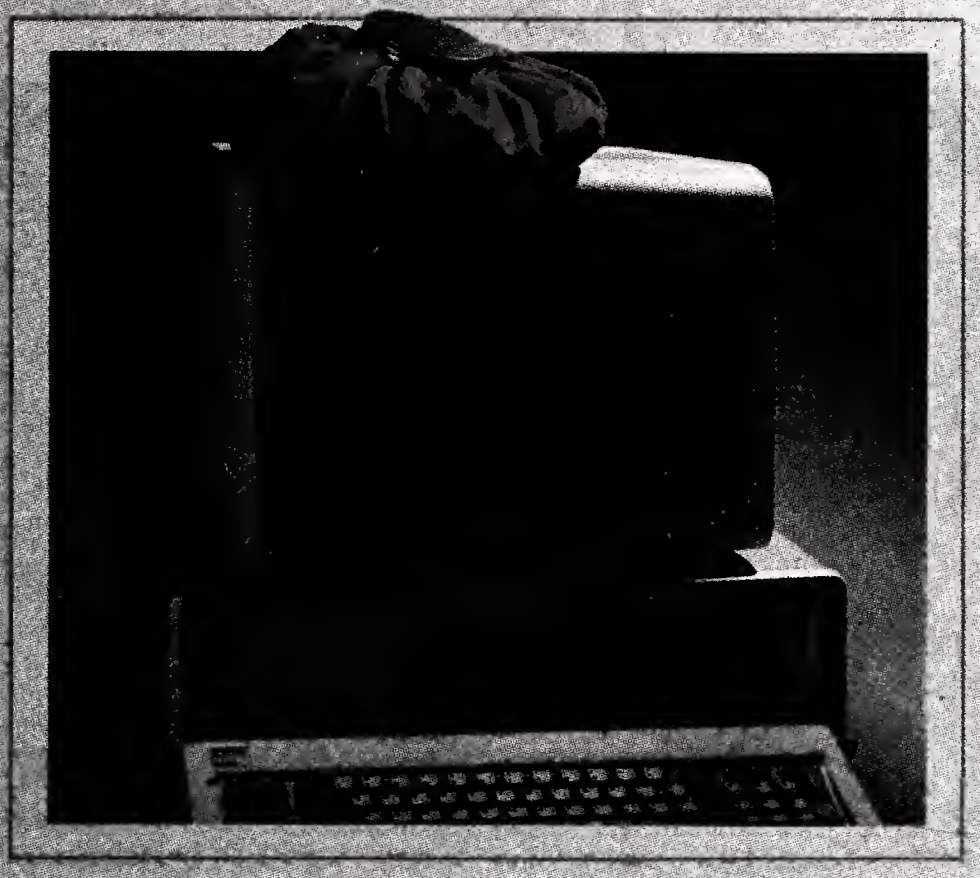
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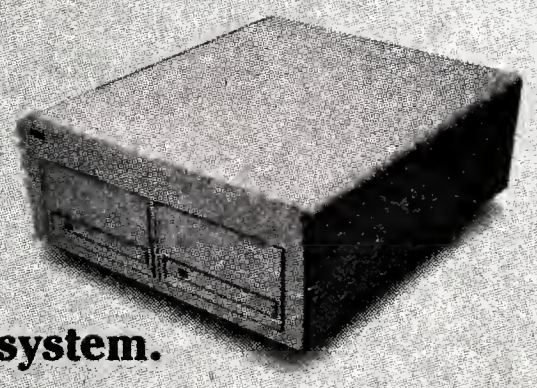
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SPECIAL **REPORT**

Rise of automated office accompanied by continued

By C.S. Thachenkary and S.E. Harris
Special to CW‡

The emergence of the automated office has brought with it a bevy of purported VDT-related ailments and a controversy over VDT health hazards. In a survey conducted by the Data Entry Management Association (Dema) in 1984, over two-thirds of those responding had experienced eye strain, back pain, fatigue and neck/shoulder pain; over one-third reported burning eyes and general irritability.

In West Germany, over one-third of the health insurance costs for women office workers are due to an increased incidence of back- and neck aches. In both the U.S. and Canada, women operators have questioned VDT emmitance of low-level radiation and its possible effect on pregnant women.

In 1983, the Canadian Center for Occupational Health and Safety found that some VDT models leak extremely low-frequency radiation and linked exposure to low-frequency radiation with reproductive defects in laboratory animals. Research in 1982 by Dr. Jose Delgado in Madrid claimed that exposure to extremely weak pulsed magnetic fields, similar to the magnetic field pulses from a VDT's fly-back transformers, caused changes in chicken embryos.

Because the more serious health problems are suspected to be caused by the emittance of low-level radiation, government agencies such as the National Institute of Occupational Safety and Health (Niosh) and the National Academy of Sciences have carried out preliminary studies. A major advocate for closer monitoring and testing of VDTs is 9 to 5, the National Association of Working Women. At this time, significant evidence of VDT links to radiation and health problems has not been established.

While the controversy continues, mounting pressure from employee organizations has prompted close to two dozen states to consider legislation regarding the use of VDTs in offices. Some states, such as Connecticut and Maine, have already passed bills; others are still discussing them.

As legislatures across the nation consider the issues pertaining to the use of VDTs in the workplace, the Computer Business Equipment Manufacturers Association (Cbema) has formed a heavily financed lobbying group that has lobbied against VDT bills in California, New York and Ohio. The bill introduced in California was defeated.

Obviously, management needs and user concerns must be addressed. An ergonomically designed office promotes both user comfort and productivity. The cost of providing ergonomically improved systems can be readily justified in terms of better health and greater productivity of office workers.

The modern workstation has three principal components: the user, the VDT-based office information center and office and office furniture.

■ The user. To ensure user comfort and health, be aware of any pre-existing health problems on your staff that might be aggravated by working in an automated office. Encourage periodic physical examinations and health maintenance.

■ The VDT. Progress is being made in VDT-based office information systems. This includes the advent of detachable keyboards, tilting/swiveling screens with amber or green displays, and screens and keyboards constructed of glare-reducing materials. Detachable and modular components significantly improve a system's ergonomics.

A 1984 study conducted by Niosh found that data entry workers using ergonomi-

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Thachenkary and Harris are members of the decision sciences faculty in the College of Business Administration at Georgia State University in Atlanta.

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...debate over possible VDT-related health hazards

cally designed terminals were measurably more productive.

A drawback of the CRT found in today's VDTs is the flicker of the image on the screen. Furthermore, VDT screens display information on a vertical plane. Most people read naturally on a horizontal plane with their necks slighty bent forward. When users are working on a VDT, their necks are forced to be in a straight and upright position. Flickering VDT images and postural stiffness can cause eye irritation and body aches.

Flicker-free images

Recent developments in plasma display technology, for example IBM's 581, make use of neon and argon gas enclosed between thin glass plates to produce stable, flicker-free images. These screens do not emit electromagnetic radiation, and they have the added advantage of being flat panel displays rather than boxy CRTs. They can also be moved easily and are less bulky.

■ The office and office furniture. Office furniture should feature orthopedically designed chairs that provide firm support for the back and allow individual height and seat adjustments. The most radical of such designs is the so-called balance chair, which has no direct back support.

An American Productivity Center survey of large organizations found that improved furniture design can increase productivity by about 12%. Additional payoffs include fewer sick days, better labor-management relations and the reduced potential of litigations and court actions to resolve health complaints. A number of organizations, including TRW, Inc. and the Canadian firm London Life, Inc., have begun to assess the ergonomic soundness of their systems and physical facilities.

The design of an ergonomic environment also includes a comprehensive physical facilities-planning program. This program helps to focus management attention on the problems of acoustics, heating and cooling, lighting, air circulation and the layout of power cables in an ergonomically designed building.

Another trend to watch is that of the so-called intelligent buildings, such as the Citiplace in Hartford, Conn., operated by Building Systems Co., a United Technologies Corp. subsidiary; and the Concourse in Atlanta, managed by MCC Powers and the Landmark Group.

Intelligent buildings are fully wired office complexes. Their construction includes a complete package of computer and communications facilities, including local-area networks, digital private branch exchanges, a mainframe computer center, satellite antennas and a host of end-user support services such as user training, security and energy control.

The cost of ergonomically improved systems can be justified in terms of better health and greater productivity of workers.

Organizations with a high level of OA should consider appointing a chief ergonomics officer. The ergonomics manager, with a background in human factors engineering, man-machine interface, physical facilities planning and environmental psychology, should develop and enforce ergonomic standards throughout the entire corporation.

This new approach to corporate management stresses not only the use of advanced technologies to increase productivity in the office, but also the development of a physical facilities plan that addresses ergonomic issues.

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POS system keeps bookstore personnel in the know

KNOXVILLE, Tenn. — The bookstore at the University of Tennessee here uses a point-of-sale (POS) terminal system to help it prepare for and survive a quarterly onslaught of students. "Speed and accuracy are essential when nearly 30,000 students hit the bookstore in three or four days to get their books," said Wade D. Meadows, the school's director of bookstores.

The University of Tennessee Book and Supply Store, which carries 3,800 textbook titles during each scholastic quarter and registered $7.3 million in sales last year, uses a system based on 31 NCR Corp. Model 2152 POS terminals. The system also includes two NCR Model 751 concentrators; a 512K-byte Honeywell, Inc. Level 6 supermini, fitted with Ultimate Corp.'s Ultimate operating system; and Applied Information Systems, Inc.'s Ratex software for bookstores. It has been in place since April 1983.

'We can gather any information we want and report it in virtually any way.'

— Wade D. Meadows, director, University of Tennessee Book and Supply Store.

During the rush of student book buying, the POS terminals allow cashiers to check students out within an average of four minutes, according to William C. McCarter, the bookstore's assistant director and operations manager. In those four minutes, the automated system enables the bookstore to gather data that allows it to monitor its inventory and make informed decisions about what books to order, in what quantity, for the future. Cashiers pass wand readers over book tags that are printed in optical character-recognition type. Information includes the book's price; its 12-digit International Standard Book Number (ISBN), which identifies the book by title and edition; and its sales class, such as whether it is a new, used or reference book. The POS terminals transmit the data to the two Model 751 concentrators, which pass it through an interface and onto a disk of the Honeywell supermini. The bookstore updates its inventory and other records nightly, McCarter said.

From this information, the store's system produces reports that help its two textbook buyers plan future orders. Because the school is on a quarter system, the bookstore must order books four times a year. The longest lead time allowed to the buyers is about 10 weeks before a quarter starts, which McCarter said "does push things a little bit."

Once every quarter, the buyers have the system generate a course history report for their use. The report includes information about textbooks from courses offered during the past 10 quarters. For all courses from those prior quarters, the report lists the estimated enrollment and actual enrollment along with the number of books purchased by students in the class. The buyers use the report and requisition forms provided by the school's academic departments to help predict the number of books a scheduled class will need.

One of the buyers, Mitchell P. Borden Jr., assistant director and textbook manager for the bookstore, said the reports provide him with "the data I need to make intelligent buying decisions — not data just in raw form, but in the format I need."

He said information from the report has allowed the store to reduce its inventory by about 10% and to increase its inventory turnover from six times a year to seven.

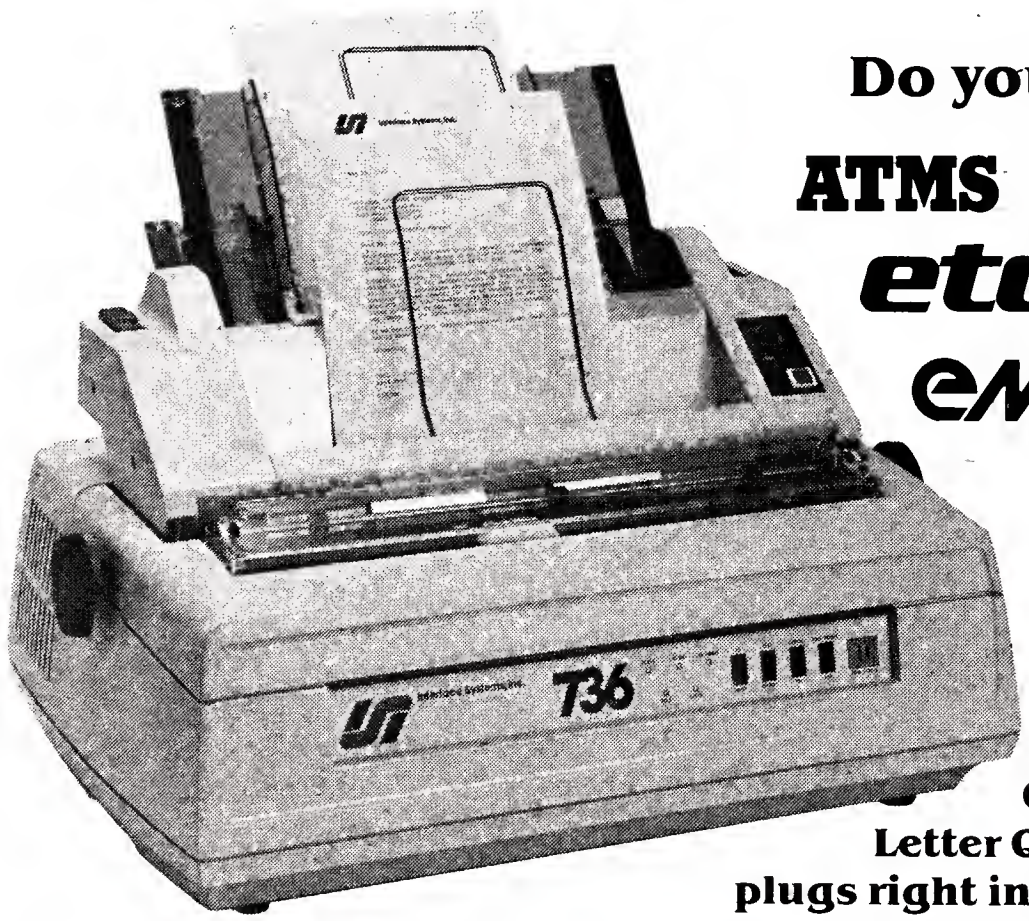
Another report, one the system generates daily, gives the bookstore current information about inventory levels. For each title the store stocks, the report subtracts the number of books that the terminals record as having been sold during the day from the number of books the store had in inventory at the beginning of the day. The report also includes information on how many copies of the book have been sold in the month to date and the year to date.

Other information the system generates daily includes:

- An accounts receivable update.
- A record of cash discounts, accounts receivable and proof reports from each terminal, which is used for balancing.
- Buy-back reports.
- Data on use of bank cards and checks.
- Cash over or under and voids, listed for each cash register.
- A sales error report, which lists incorrect, illegible or missing ISBN numbers from the day's sales.

The system also generates reports on demand to monitor credit card transactions, purchases made by check and other variables. "We can gather any information we want and report it in virtually any way," Meadows said. "Consequently, reporting overall is much better than in the past, [as] is cash control."

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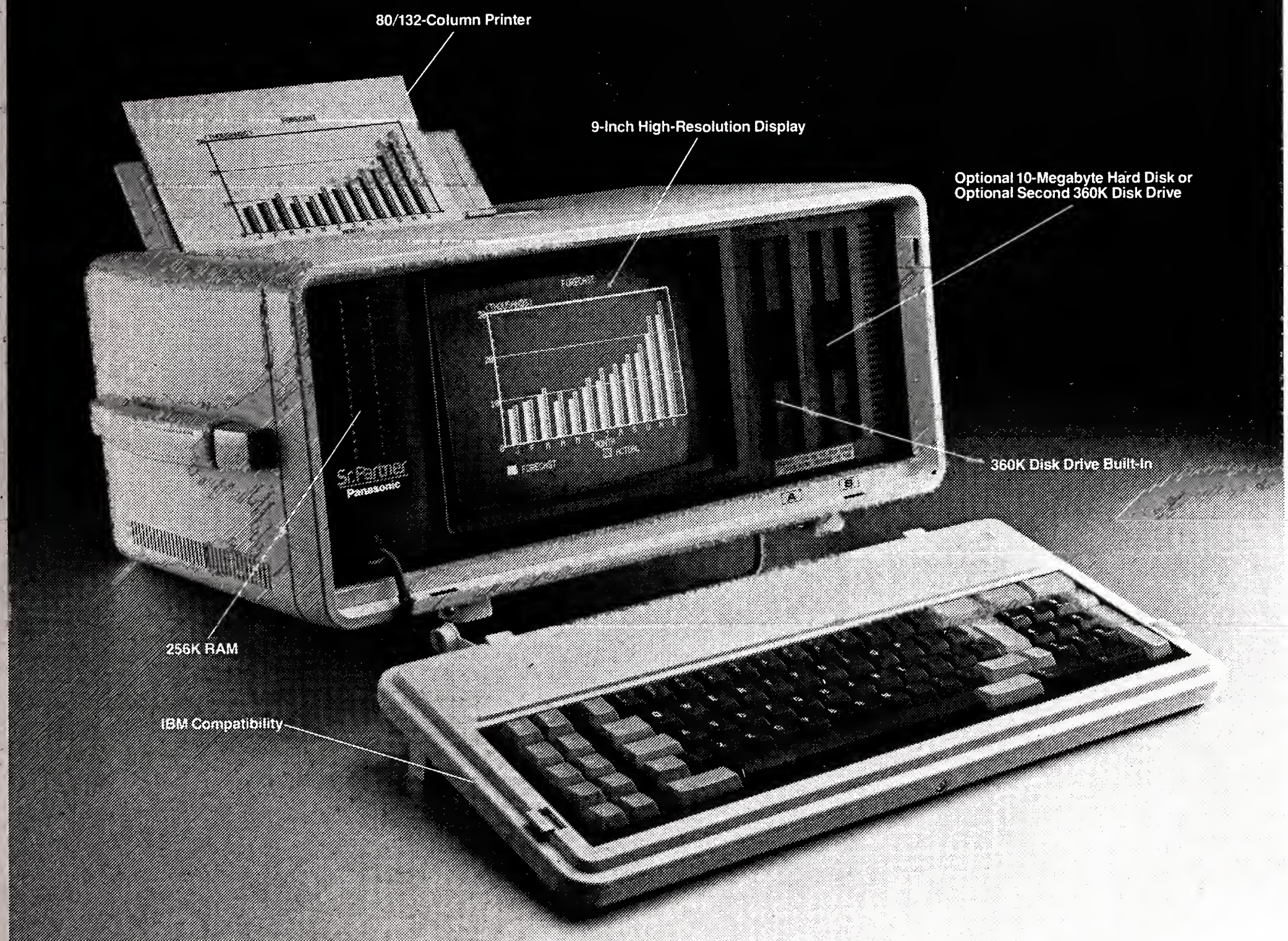
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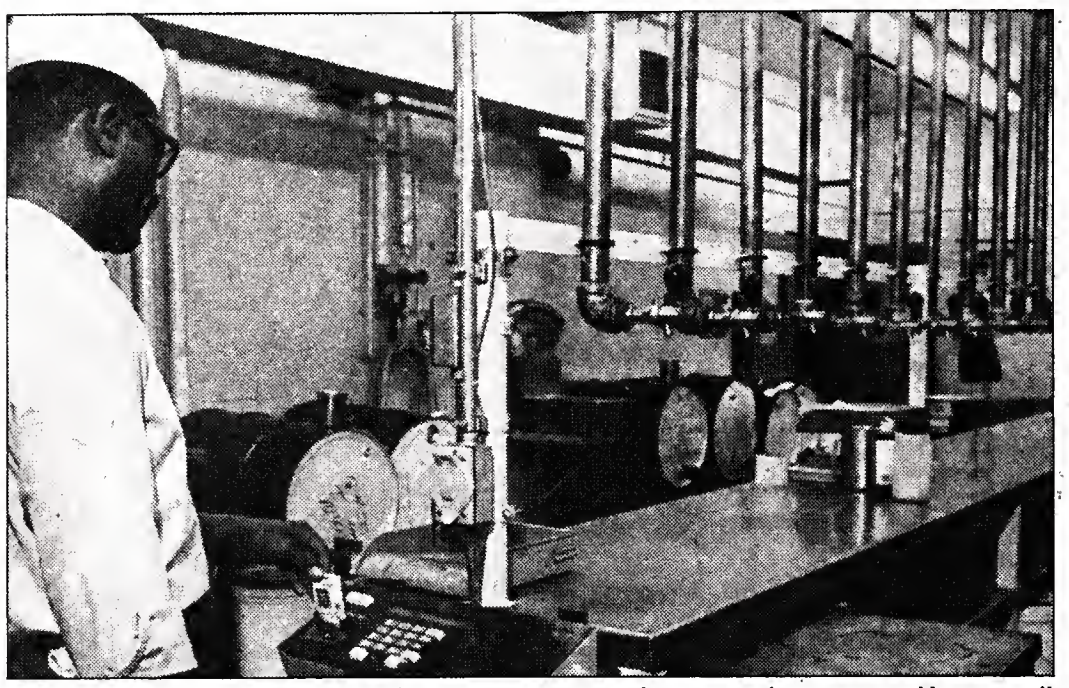
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To begin work on any production process, a worker must log on to a Honeywell 3305 terminal and key in information about the work he plans to do.

Food lab's work flow monitored by terminals

ALSIP, Ill. — A laboratory here that supplies seasonings and ingredients to the food industry depends on a system of data entry terminals to make sure its many chefs do not spoil the broth (or the pancake mix or meat tenderizer, for that matter).

Griffith Laboratories USA, Inc. is one of the world's largest suppliers of seasonings and food ingredients. At its manufacturing plants here and in Union, N.J., Union City, Calif., and Lithonia, Ga., Griffith produces about 15,000 different seasonings and ingredients for 8,000 commercial processed food manufacturers, distributors, restaurants and institutions. It has 38 recipes for barbecued potato chip seasonings alone.

About 600 employees at the four manufacturing plants produce the ingredients, and a shop floor data collection system, the Factory Management System (FMS) from Honeywell, Inc., coordinates the employees' work through every step of production.

The FMS at each manufacturing plant consists of:

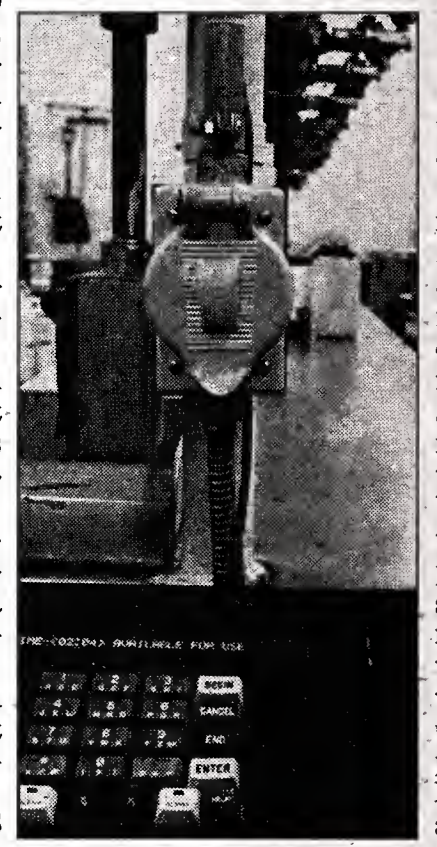
■ A 1M-byte Honeywell DPS 6 minicomputer.

■ Ten Honeywell 3305 terminals that guide employees through the production process.

■ Twelve Honeywell 7200 CRT terminals used for data entry and work-in-process inquiries.

■ Two Honeywell 3301 terminals that monitor employee attendance.

■ Honeywell's FMS software, which runs the different terminals in the system.



To begin work at any stage in the production process, an employee must log on to a Honeywell 3305 data collection terminal and key in his intentions. FMS keeps track of each stage, so if an employee tells the terminal he wants to perform work that has already been completed or perform a step out of order, the system advises him against it.

According to Robert Brunson, Griffith's MIS director, "One particularly helpful aspect of FMS is that it helps avoid conflicting labor reports, and it tracks job progress according to our preset standards."

When employees in Griffith's customer service department receive an order from a customer, they enter information about the order into the DPS 6 via one of the 7200 terminals. The mini produces documents, such as recipes, to guide production work. A production scheduler receives these documents, and he schedules production work at the manufacturing plant. Most orders go into production within three days after they are received, Brunson said.

At the manufacturing plants, each order follows a production process that has seven set stages:

■ Staging. Employees gather standard-size packages of ingredients from warehouses for use in the recipe.

■ Batching. Employees gather the remainder of an ingredient called for in the recipe.

■ Mixing. Employees follow the recipe to put the correct amount of ingredients into a mixer at specified times.

■ Quality testing. A sample of the product is sent to Griffith's laboratory, where it is tested against the client's standards.

■ Dumping. The mixture is unloaded from the mixer and loaded into bulk containers or sent via conveyor belt to the packaging department for division into smaller containers.

■ Packing. The mixture is packaged according to customer specifications.

■ Weighing. Each case of the product passes over a scale, and cases that do not pass muster are pulled from shipment until their weight is corrected.

Employees key information into the shop floor system via their 3305 terminals to signal the beginning and end of each task within each production stage, and the information is recorded on the minicomputer. When customers call to check on work in progress, customer service employees make inquiries through their 7200 terminals and provide up-to-the-minute reports, Brunson said.

He said the system also keeps track of the time employees take to finish each task, and customers' bills reflect the amount of time it takes the firm to process an order from beginning to end.

Employee attendance data is recorded on the system through the 3301 terminals. Whenever an employee enters or leaves the manufacturing plant, he must insert a punch card — bearing his employee number — into one of the 3301s. The machines read the employee number and time of entry or exit and register the data on the DPS 6. Griffith uses the information to process its payroll and to keep track of employees' sick days.

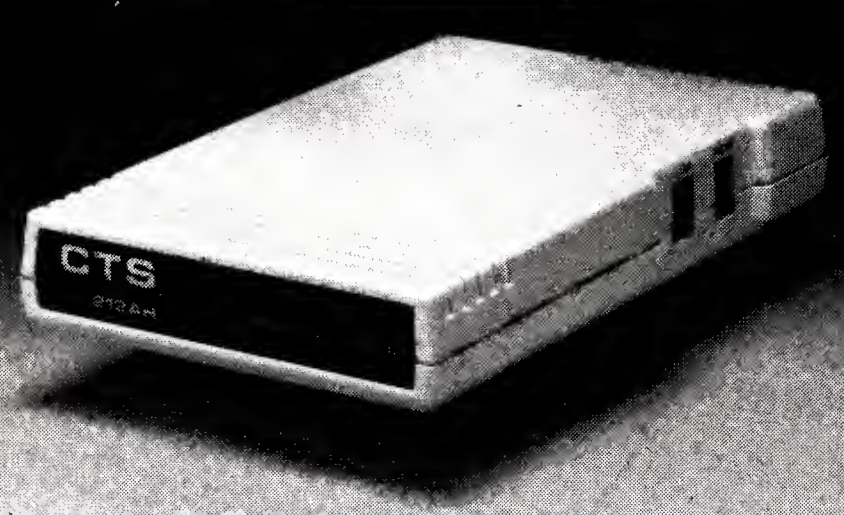
The firm transmits information daily from the DPS 6 over Wats lines, through a Honeywell Datanet 8 front-end processor and into a 3M-byte DPS 7/55 mainframe at headquarters here. Brunson said Griffith's management uses information from the shop floor data collection system to help it measure production.

The firm plans to integrate the shop floor system into an overall manufacturing resource planning system within two years, according to Brunson. The system Griffith envisions will provide resource management from the time the firm orders raw materials through the time it ships a finished order to a customer.

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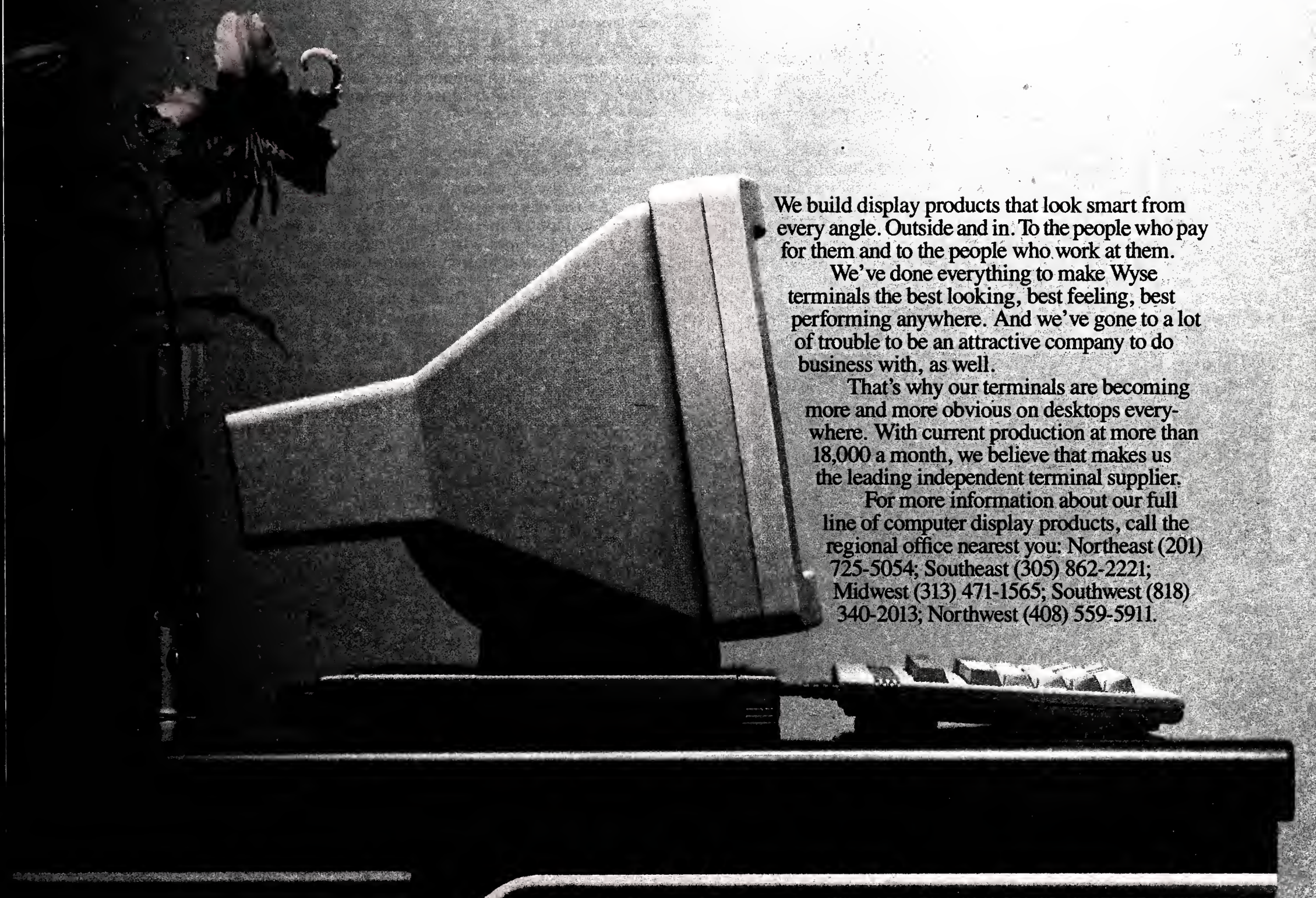
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SPECIAL **REPORT**

Fiber optics offers prudent alternative to EIA choices

Communications speed, distances increased without degrading signal quality

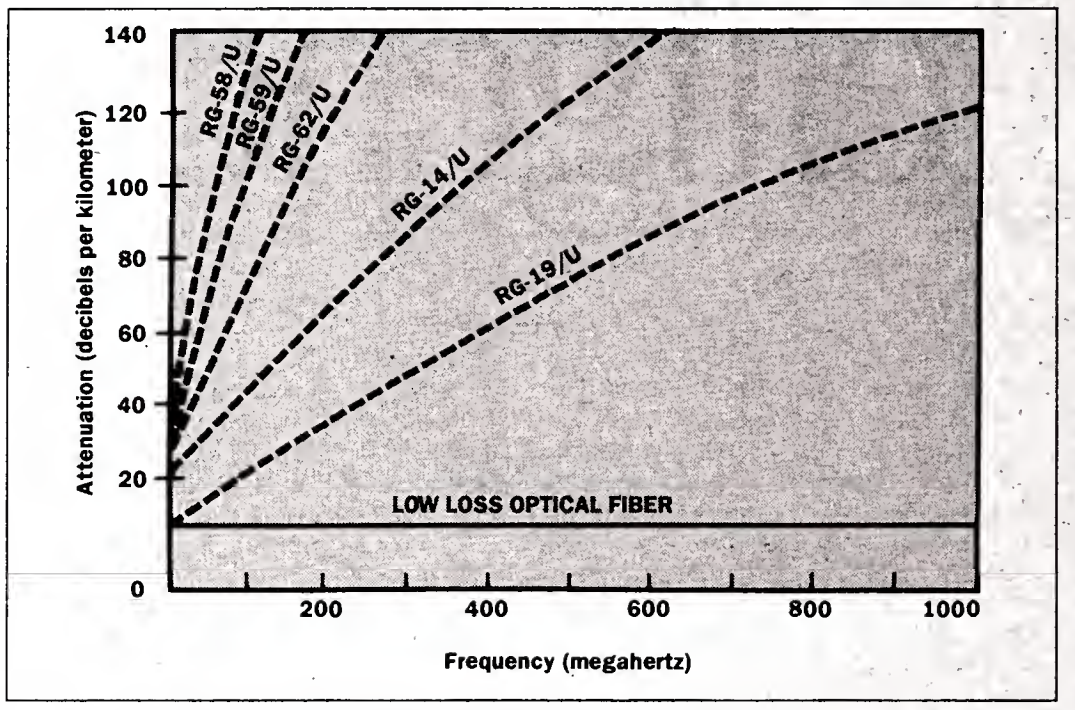
By James B. Bartula
Special to CW‡

With the advent of fiber-optic communications in the computer industry, managers are now faced with choosing between fiber-optic VDTs, communications boards and cables and their more traditional Electronic Industries Association (EIA) counterparts.

The advantage of using fiber-optics hardware and cables is the increased distance from one communications point (such as a VDT) to another (such as a host computer) that they provide. The need for many short-haul modems is eliminated when fiber optics is used. Current fiber-optic VDTs can be located 1,000 meters or 3,280 feet from a host without the need for short-haul modems.

Another advantage of fiber optics is the speed that light pulses can travel through a fiber cable. Fiber-optic products can communicate at top speeds from 19,200 to 38,400 bit/sec over a 1,000-meter fiber-optic cable. This can be contrasted with the 1,200 bit/sec speed for a 914-meter EIA RS-232C cable, which is the maximum length of cable allowed by the Texas Instruments, Inc. EIA Distance Policy (see story below).

Light is divided into different frequencies. When light is passed though a prism, each frequency emits its own color varying from red to violet. Each light frequency or color is several orders of magnitude higher than the highest frequencies that are now used in the copper wires of computer communications. The higher a given frequency of light, the more information that frequency can carry. For example, a single 125-micron diameter (about the size of a human hair) fiber-optic cable can carry the same amount of information as 900 pairs of copper wires.



High data transmission rates require high-frequency signals. When signals between VDTs and their host computers are carried through copper cables like RG-58/U, 59/U, 62/U, 14/U and 19/U, the signals suffer increased degradation as frequency increases.

As the distance from a VDT to a host computer increases, the signal carried by copper wires is degraded. This signal degradation or "attenuation" occurs because copper wires offer resistance to the flow of the electrical signals they carry. Also, attenuation in copper wires increases as the frequencies going through them increase (See figure 1). Because faster data rates require higher frequencies to carry additional information, these faster data rates result in a high attenuation. This characteristic of copper wires makes them difficult to use in high-speed, long-distance communications.

In contrast to copper wires, the attenuation of fiber-optic cables remains flat as the frequency of the light going through them increases.

Fiber-optic cable with less than one decibel (a decibel is a measurement of loss) of attenuation per kilometer is now available. It is the ability to carry high frequencies with low attenuation and more data at faster data rates over longer distances.

Another advantage of fiber optics is that is it dielectric; it does not emit electromagnetic energy. Fiber-optic cables do not require special shielding to comply with the Federal Communication Commission's electromagnetic interference regulations.

Its dielectric properties make fiber optics suited for use in electrically "noisy" environments. Copper wires can pick up electrical energy emitted by machinery in a noisy environment, transmit it to a host computer or VDT and thus cause malfunctions.

Additional advantages of fiber optics include:

- Increased data communications security. It is almost impossible to tap into fiber-optic communications without affecting the transmission enough to be detectable.
- Space constraints. Fiber-optic cable is smaller and lighter than copper cable.
- Fiber-optic products are safer from electrostatic discharges or electrical storms.

Fiber optics has made its debut in the computer industry. Its advantages will lead many computer users to consider and select fiber-optic equipment.

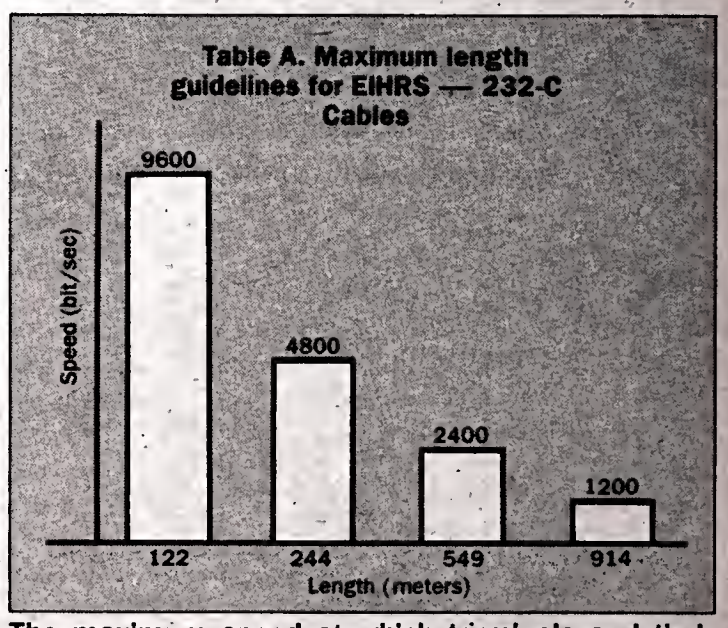
Bartula is a Product Manager for business system computers with the Data Systems Group of Texas Instruments, Inc. in Austin, Texas.

Cable distances for TI products

Texas Instruments, Inc's. Electronic Industries Association (EIA) Distance Policy states recommended distances between terminals and printers and their host when EIA RS-232C cable is used. TI sanctions operations at distances up to 15 meters, but does not guarantee error-free operation beyond that distance.

The table to the right lists the maximum lengths of EIA RS-232C cable and the associated maximum speed that is used with TI products. To operate at maximum distances, end users must meet restrictions on the types of data equipment used, electrical environment, cable construction and cable wiring.

The table shows that the maximum EIA RS-232C cable length is 914 meters, but this distance can only be attained when using a communications speed of 1,200 bit/ sec. The fastest speed available over EIA RS-232C cable is 9,600 bit/sec; this speed can only be attained at a maximum distance of 122 meters.



The maximum speed at which terminals and their hosts can communicate over TI's EIA RS-232C cable decreases as the distance between the machines increases.



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SPECIAL **REPORT**

Investment in ergonomics can pay healthy dividends

By Robert L. Barcza
Special to CW‡

Office ergonomics can affect productivity and profits as well as employee morale, safety and health. The National Institute of Occupational Safety and Health reported that an ergonomically sound automated workstation can boost productivity by more than 20%.

The expansion of computer technology into every facet of office activity has dramatically changed the character of today's office. Local-area networking and word processing, for example, have made marked improvements in office output. The human factor in office automation, however, was neglected in the rush to automate the workplace. As a result, complaints of eye- and back strain and questions of radiation-related pregnancy and eye complications have cost U.S. businesses millions of dollars (see story SR/26).

Many corporations now carefully evaluate their seating, lighting, computer-support furniture, acoustics and wire management systems to ensure that new and existing OA installations are ergonomically sound as well as cost-efficient and profit-boosting. The following topics should be considered when designing an ergonomically sound office environment.

■ Seating is a primary concern for worker comfort. Offices should be equipped with chairs that fit user, not designer, specifications. Chairs should be adjustable at the seat and back to fit the user and provide proper lumbar support. Furthermore, a chair's design should reduce pressure on the arms and upper legs and behind the knees. A properly fitting chair and regular rest breaks away from the workstation (some industry groups suggest 15 minutes every two hours) are effective ways to reduce back strain and provide greater comfort.

■ Computer support furniture, such as tables and desks, should be another management concern when designing an ergonomically sound office. Tables and desks should be adjustable. In addition, tables that support VDTs should include mechanisms, such as a cantilever, for altering the work surface and the keyboard shelf positions.

Currently, retractable articulating keyboard shelves are popular with occasional computer users. These devices support the computer keyboard and can be adjusted both vertically and horizontally. When the computer is not being used, the shelf retracts and rests under the work surface. Unfortunately, many of these shelves protrude four to seven inches below the work surface, restricting leg movement. The best option in a keyboard shelf is one that retracts, then swivels to a 90-degree angle below the work surface, freeing the legs to move as needed.

■ Lighting and acoustics play a major role in worker comfort. Poor lighting can cause eye strain, which can lead to headaches and dizziness. One way to cut down on eye strain is to select terminal screens that tilt and to outfit the screens with glare-reducing filters and hoods. Also, consider the light source. Lights should be positioned so that they are neither directly behind nor directly above the seated worker.

Ambient lights are one way to provide low-glare lighting. Ambient lights reflect light off the ceiling, creating an umbrella effect of softer light, which reduces glare and shadow. Ambient lighting offers other benefits as well. Because they are not necessarily stationary, these lights can often be moved to accommodate a new office layout. In addition, because, for tax purposes, these lights are recognized as furniture, their amortization schedule is attractive.

One cost-efficient solution to lighting problems in an open-plan office is to use properly designed ceiling fixtures supplemented by panel-hung task lights. Task lights also brighten shadowy work surfaces.

■ Excessive noise can affect worker productivity. One way to reduce noise in this situation is to use wider, 3½-in. thick, sound-absorbing divider panels and situate furniture and lighting fixtures to reflect and dissipate sound.

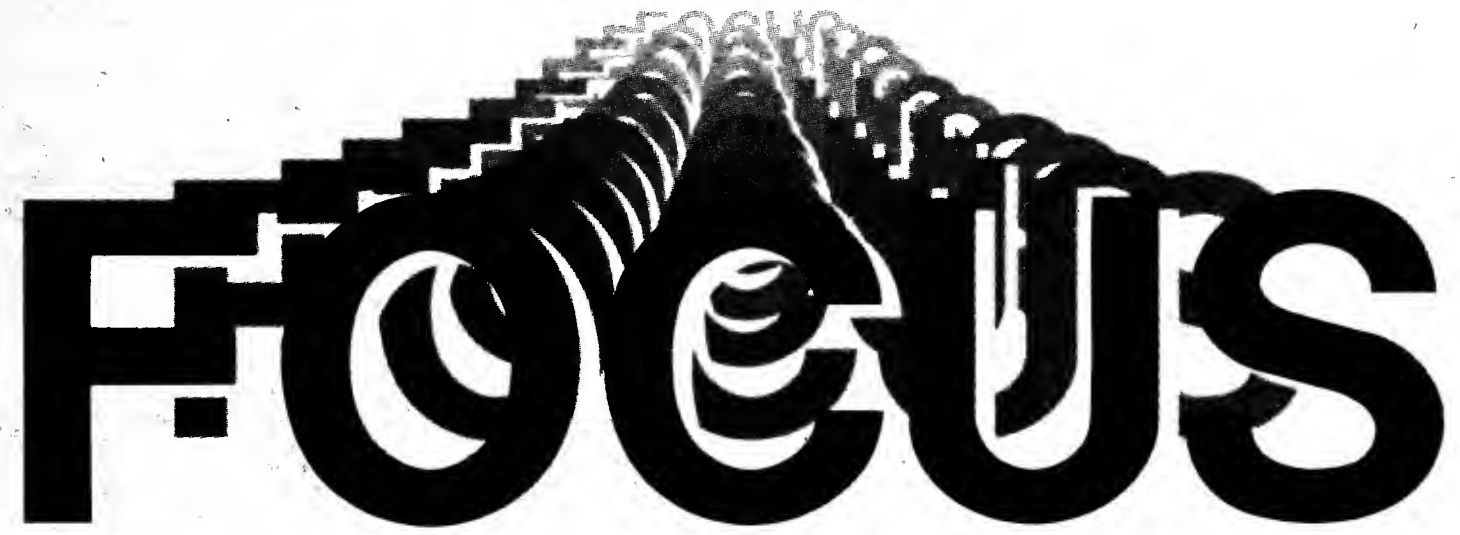
■ Wide panels also increase an office's wire management options. Increased panel widths have a greater capacity for both designated and dedicated power lines at the base of

See **HEALTH** SR/38

The most reliable method of determining if your staff is comfortable in the automated office is to ask them.

Barcza is director of national accounts for Shaw-Walker Co., a Muskegon, Mich., manufacturer of office furniture and systems.

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Device upkeep maximizes benefits, minimizes costs

By Steve Aaron
Special to CW‡

Whether a company has 200 terminals or a single user, the benefits of good service and proper terminal maintenance means maximized uptime and cost-effective servicing.

Technological advances and the increased user dependence on computer systems has changed the way terminals are maintained and serviced. Ten years ago, terminals were periodically overhauled. Today's improved manufacturing standards and advanced electronics have made the scheduling of major and lengthy maintenance obsolete. Terminals in use today require more preventive maintenance and vendor support.

To maintain terminals, companies must establish basic preventive maintenance procedures that can be easily executed by terminal operators.

Many vendors have reacted to this need by including service options as an integral part of their selling packages. Service organizations, which share the maintenance responsibilities with the operator, are also more prevalent.

To help maintain a network of terminals, companies must establish basic preventive maintenance procedures that can be easily executed by terminal operators. In addition, they must select an equipment service contract that will meet all maintenance contingencies.

The investment of time needed to become versed in the simple preventive maintenance procedures outlined here will pay significant dividends in the form of optimal performance and uptime. The first step to take is the proper installation of terminals and customer training for those who will use them. Most computer failures occur during the first 90 days after an installation, oftentimes because of users' unfamiliarity with the system. Computer terminals are increasingly complex, and customer training helps to prevent downtime.

During training, a good service technician will explain the procedures and precautions operators must take. A good operator will take the time to listen and ask questions.

Operator's manuals are a good source of information for users. When reading, users should pay close attention to key parameters, including bit/sec rate, parity and duplex. This information should be kept handy, as it can serve as a quick reference for the basic operation of the equipment. The information is particularly helpful if the terminals are part of a shared system.

No training program is complete without a mention of the habits that can jeopardize electronic equipment. Although terminals, printers and electronic typewriters should be kept clean, care should be taken. Standard commercial cleaners can be used on most equipment, but spills will short out the unit. Similarly, placing a coffee cup on top of a terminal is a risk. Spills are referred to as "abuse" in most maintenance agreements .

In addition to spills, dropped staples, paper clips and other desktop paraphernalia can also damage a keyboard by shorting the circuit cards beneath the keys. Symptoms of this abuse include repeating characters or sticky keys.

Excessive heat can also cause terminals and other electronic equipment to malfunction. For this reason, air vents in CRT terminals and printer covers should not be blocked. Blocked air vents can cause a terminal to overheat, increasing the chances of failure. For the same reason, a terminal should not be placed in direct sunlight.

Another factor that can play a part in a terminal's possible malfunction is the use of improper cabling and electrical outlets. Plugging terminals into ungrounded extension cords is dangerous. These ungrounded cords can cause imperceptible shorts and related problems such as glitches and garble.

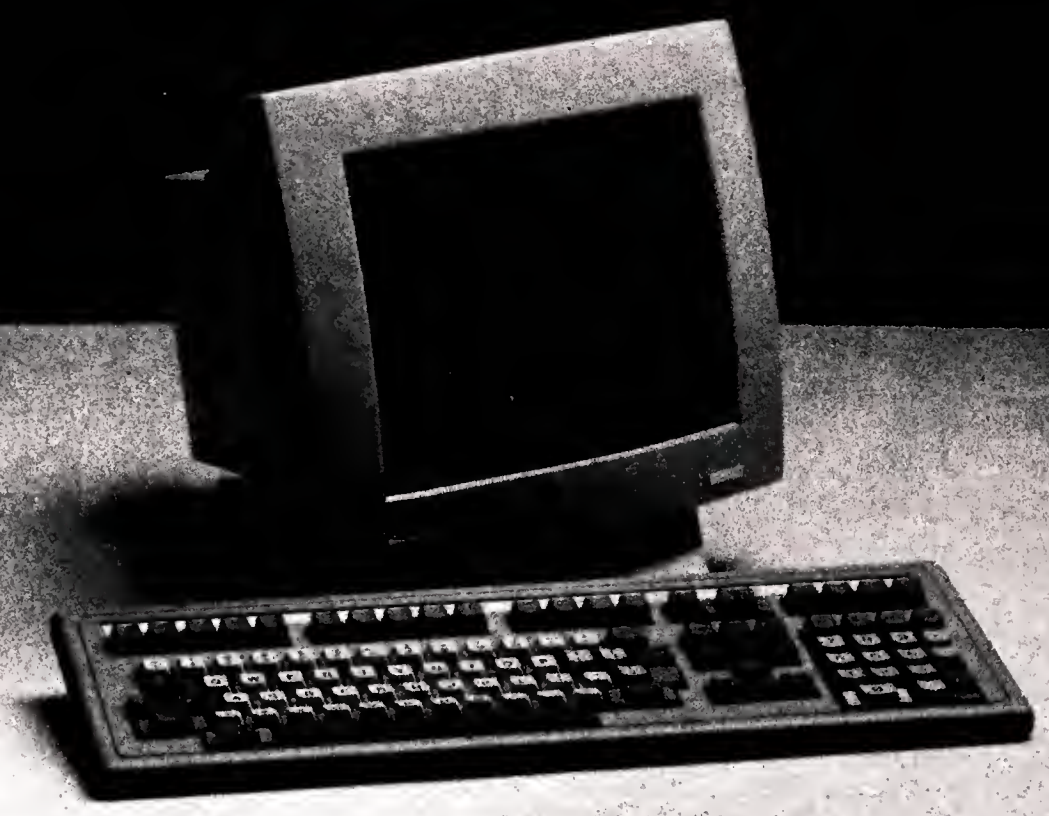
Environmental conditions also affect the performance of terminals and printers. Humidity, smoke and dust can impede the smooth operation of the terminal. Micros are especially sensitive to these elements.

A capable service technician can easily pinpoint and correct many problems over the telephone. The key here is patience. If you must make a service call, explain the problem to the technician and let him ask questions. Questions such as "Did you plug in the system?" or "Have you flicked the 'on' switch?" may sound

See **SERVICE** SR/38

Aaron is a national field service manager for Data Access Systems, Inc., a Blackwood, N.Y., distributor of terminals, personal computers and peripherals with service, leasing and supply capabilities.

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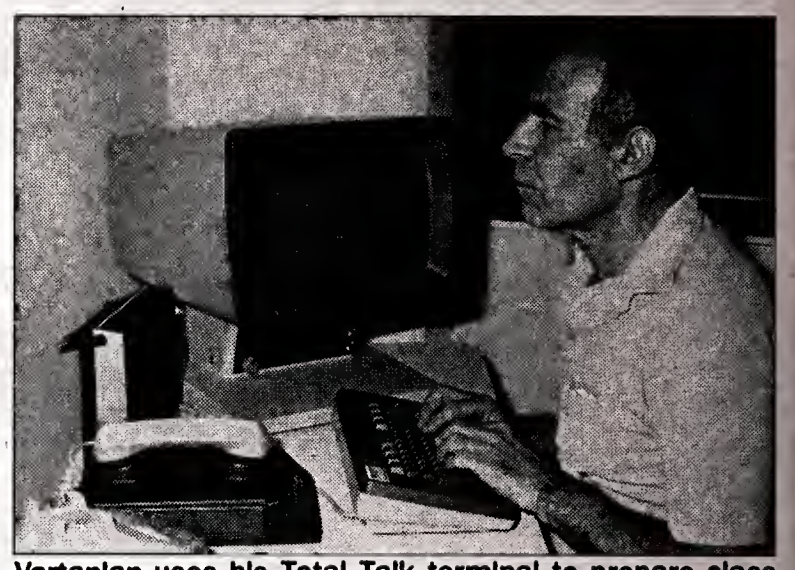
Scholar praises electronic fellow

SAN DIEGO — A blind scholar of American thought who teaches at San Diego State University here has great esteem for a colleague he calls "the fellow," even though this fellow speaks not with learned authority, but with a Swedish accent.

"The fellow" is one of two talking computer terminals that Pershing Vartanian uses to help him write correspondence, course outlines, exams, article drafts and manuscript summaries. Vartanian types information into the machines using a standard keyboard. The terminals then read back the information word by word, line by line or a screen at a time, depending on instructions Vartanian enters on the computer terminal's numeric keypad.

The machines, Total Talk terminals from Maryland Computer Services (MCS), are Hewlett-Packard Co. 125s fitted with speech synthesis boards, speech control panels and software that allows them to turn any group of characters into a spoken word. Vartanian uses one Total Talk machine at home as a standalone workstation and another at San Diego State as a terminal that accesses the school's three mainframes.

Vartanian said the terminals' ability to read back prose he has written allows him to regain the control over his writing that he enjoyed before he lost his sight. "The MCS equipment is a built-in pair of eyes that I can use for immediate response," he said.



Vartanian uses his Total Talk terminal to prepare class work and to compose his personal correspondence.

Vartanian had prided himself on his scholarly writing, but could not carry it out alone after he went blind. "I had to rely on others to help me," he said. "For a writer like myself, it was an aggravating intrusion on a very personal experience."

Vartanian lost his sight through a degenerative disease called retinitis pigmentosa in 1958, when he was 26 years old. He had been working as a high school teacher and continued to teach for three years. Assistants helped him type class material, correct papers and perform tasks he was no longer able to handle alone.

During the summers, he studied toward a master's degree at Columbia University. As he composed his thesis for the degree, a treatise called "The Puritan Symbol in American Thought," his handicap intruded on his work.

"Most of the time I had to rely on an assistant," he said. When he worked alone, he left scrambled notes for his typist and hoped the typist could decipher what he had written. "It wasn't the most efficient or pleasant way to write a thesis, to say the least," he said.

In 1968, Vartanian began work as an assistant professor of history at San Diego State and was completing work on his Ph.D. in American history from the University of Michigan. He grew increasingly frustrated at his dependence on others for help in his scholarly pursuits.

In 1980, he began looking for a tool to help him regain independence. "By then I had been teaching at the college level for about 15 years and was more than ready for a talking computer," he said.

He called MCS' president and explained his needs. "I told him I wanted the machine to be able to spell a word on demand, to speak one word at a time, a line at a time and a page at a time," he said.

Vartanian said Total Talk met his specifications, and he purchased his first terminal shortly afterwards. He later traded that terminal for the one he now calls "the fellow," an upgraded version called Total Talk II, which he uses at home to perform about 80% of his work.

In his office at the university, Vartanian works on another Total Talk, which the school purchased for his use. The machine has access, via a modem, to the school's three mainframes, a Control Data Corp. Cyber 170/150, a Digital Equipment Corp. VAX-11/780 and a DEC PDP-11/45. The school has a second Total Talk in its handicapped student center.

Vartanian said that some blind people have difficulty adjusting to the machines because they have relied on braille and other tactile aids throughout their lives. "But for me," he added, "[the terminals] relieved a lot of frustration and anger that I had built up in regard to writing and independence."

He is currently using the machines to help him compose a book that traces the trend toward specialization in American education and the reaction against that trend.

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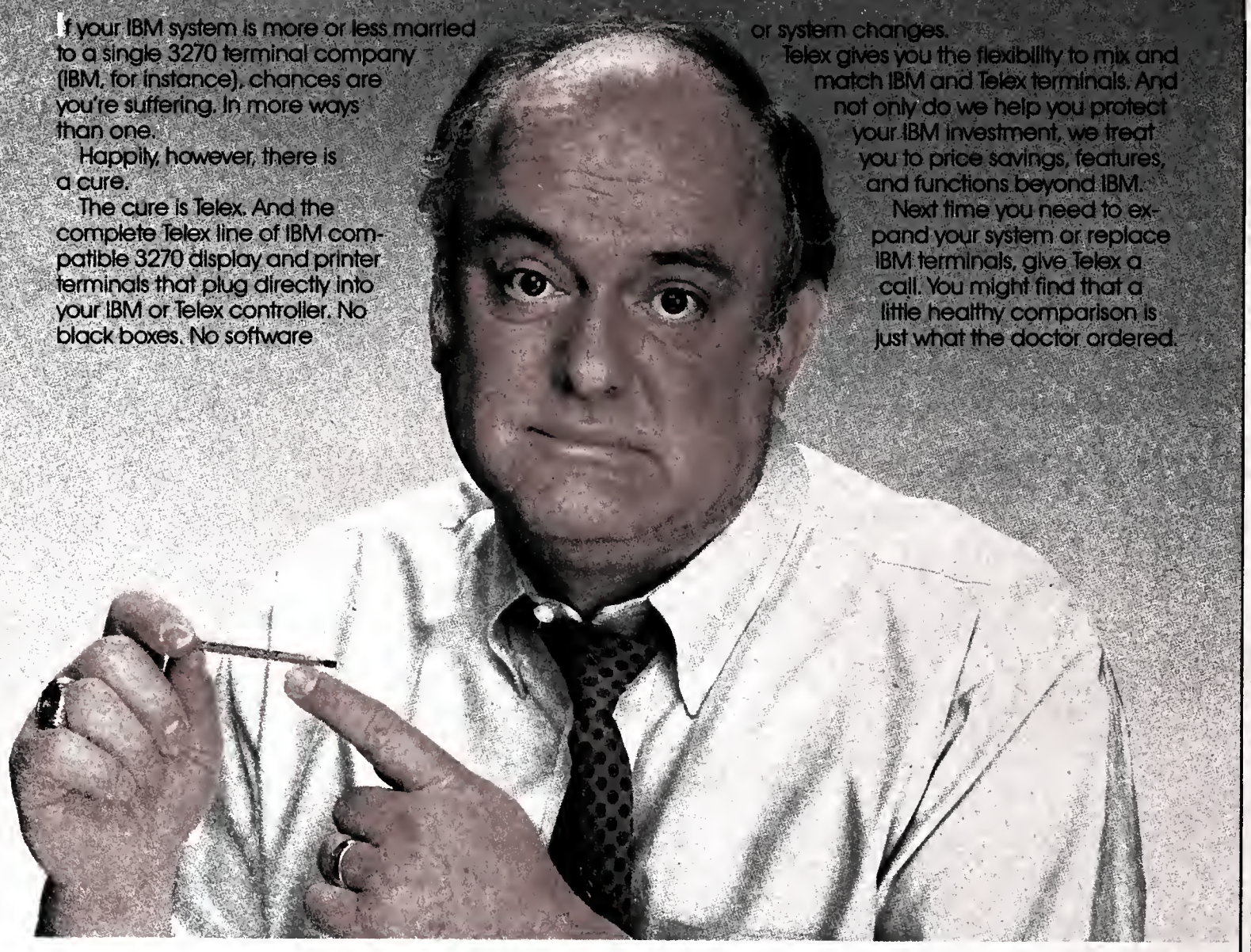
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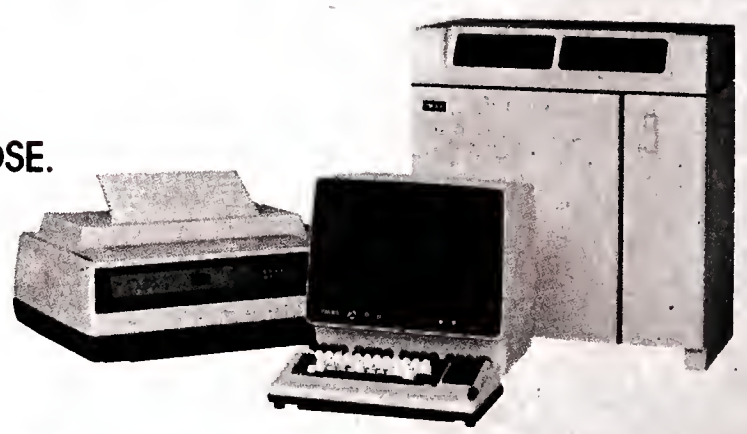
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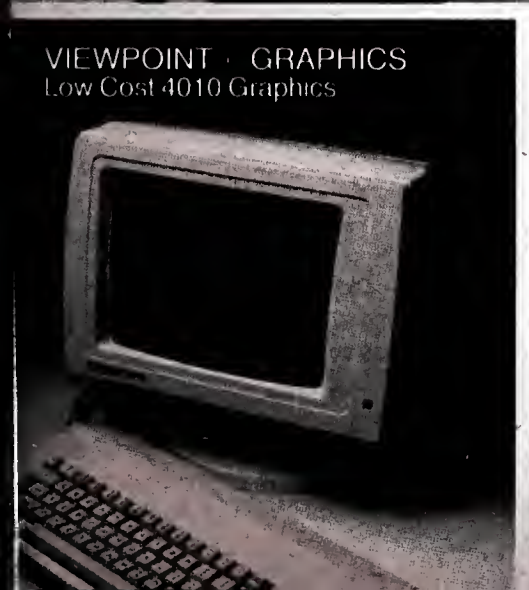
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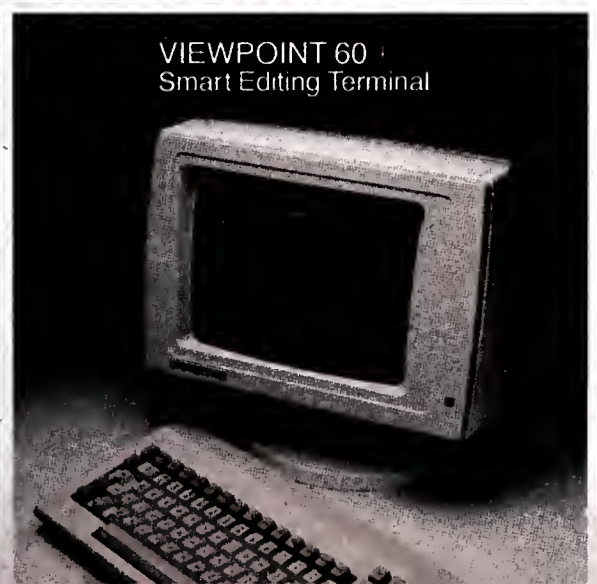
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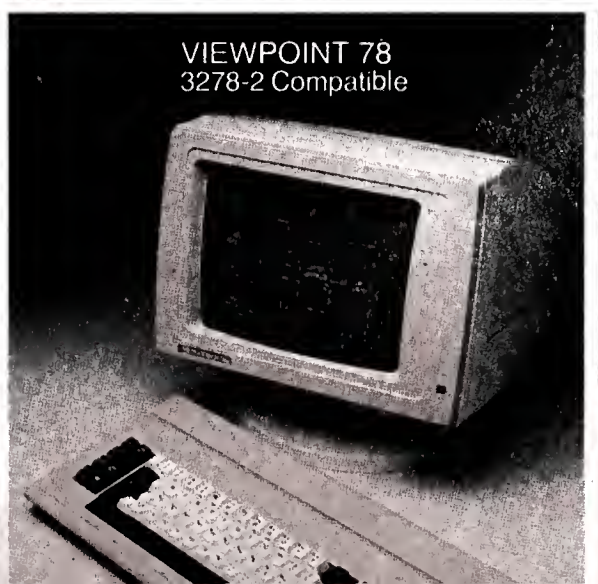
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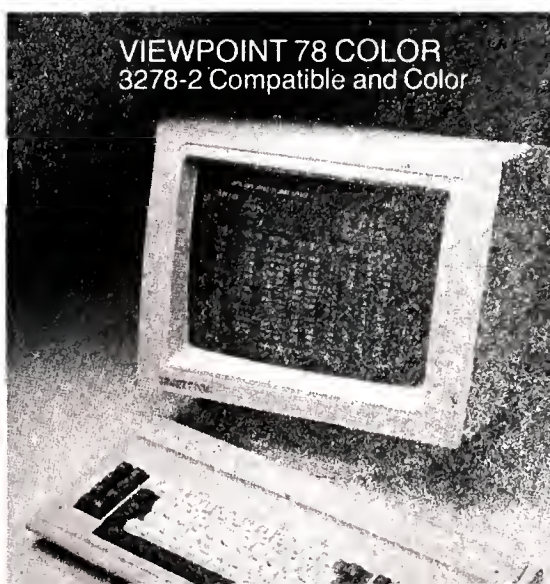
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SERVICE from SR/34

simplistic, but these points are sometimes easily overlooked. Data Access Systems, Inc.'s service division has found that 10% of their service calls are attributed to these oversights.

Prevent unnecessary service calls

To save the expense of unnecessary service visits, make sure terminal operators check with the systems operator before calling a service technician. Often what is perceived as an individual terminal problem can actually be an entire system failure or a temporary shutdown.

There are many forms of service contracts to satisfy different end-user needs. When considering the purchase of a service contract, ask the vendor or manufacturer these questions:

- Do they have their own service technicians?
- Do they offer a 90-day warranty, preferably on-site with complete vendor responsibility for problems during this period?
- What facilities does the manufacturer or vendor have?
- Does the service organization have a center for refurbishing circuit cards and terminals?
- Does it have a central dispatch toll-free number?
- Does it have national coverage with service centers in key metropolitan areas? Do the local centers offer walk-in service to avoid technician travel time and expense?

Service agreements are available in the following forms:

- Maintenance contract. This type of policy provides one-year, on-site maintenance; the prepaid fee is typically based upon the price of the unit.
- Return-to-depot contract. This contract is considerably less expensive than the maintenance contract because repair work is done at a service center. While the unit is in for repair, better service vendors do light, preventive maintenance such as clean the keyboard.
- Time and material. Some computer terminal owners are willing to risk having no service coverage; when a unit fails, they call for on-site service and pay a portal-to-portal rate on an hourly basis as well as the price of a part, if a new part is indicated. An alternative would be to deliver a failing unit to a service center; the charge is based on actual time and material necessary to repair the unit with no travel time charges.
- In-house servicing. Some companies find it cost-effective to establish internal service capabilities. These are typically large companies with a great number of computer terminals. Today's simpler and smaller units require no more effort than to replace a defective board with a new board at an exchange rate.

A careful analysis of the capabilities and services offered by a manufacturer or vendor is well worth the effort. At the very least, a service organization should have appropriate and ample facilities manned by capable service technicians. A 90-day warranty, preferably for on-site service with the vendor assuming complete responsibility for problems during this period, might be considered standard.

The ideal service package will also include a center for refurbishing circuit cards and terminals, a central dispatch toll-free number and national coverage with service centers in key metropolitan areas that offer walk-in services.

If your vendor or manufacturer offers most or all of these capabilities and services, and your operators develop a habit of preventive maintenance, you can be assured that your computer terminals will provide the performance they were designed to give.



HEALTH from SR/33

the system. Some open office panel systems are internally wired, bringing electrical outlets to the actual work surface. By internally routing computer wires and cables, lines running down the exterior of the panel, as well as tombstones (floor-mounted electrical outlets that limit rearrangment of the office layout) are eliminated.

Flat wiring

Flat wiring is an inexpensive and concealable means of managing the various wires and cables needed in an automated, conventional office environment — one furnished with stand-alone desks. Here, flat wires are run along the floor, under the carpet, to deliver electrical support where needed. These wires are rerouted by taking up the carpet. Many offices now use removable carpet tiles, which makes rerouting, if needed, easier.

Although focusing on the physical characteristics of the office will undoubtably improve its ergonomic fitness, the most reliable method of determining if your staff is comfortable in the automated office is to ask them. Find out if glare is a problem. Ask if desks and tables are appropriately fitted, and try alternatives if necessary. If possible, arrange for a prepurchase trial period to test the computer equipment under consideration.

The National Office Products Association 1983 survey on "The Future of the Office Furniture Industry" reported that personnel expenses now account for approximately 40% of the total cost of doing business. Expenditures for furniture and equipment consumed only an estimated 1% of the total.

It is essential, therefore, that personnel are comfortable with office automation and that investments in computer upgrades do not drive away valued employees. While the computer vendor will have a replacement on the shelf, the available labor pool may not be so bountiful.

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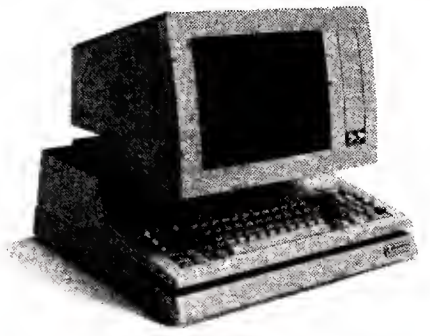
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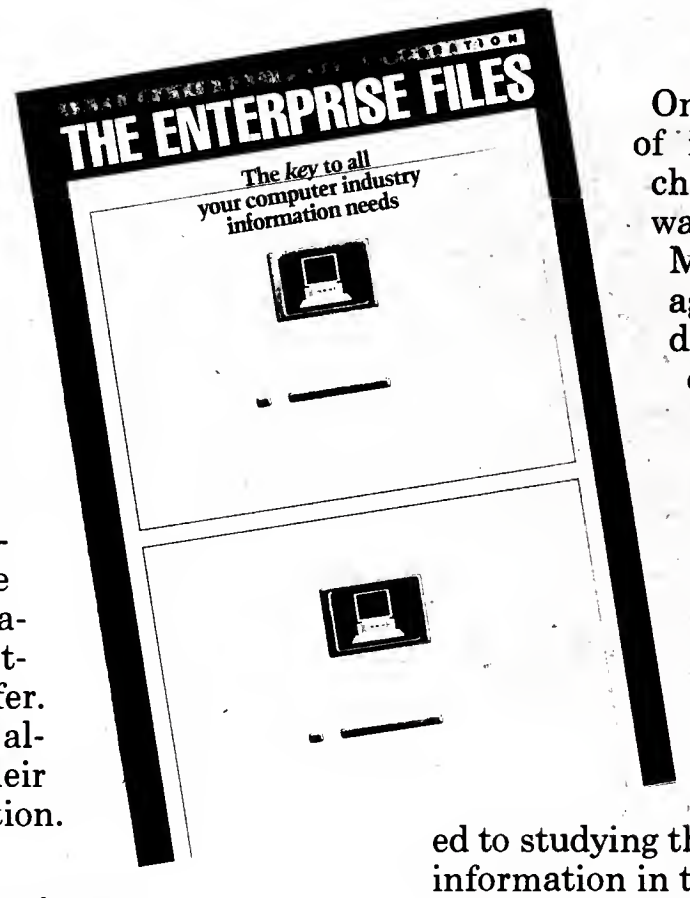
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INTERNATIONAL DATA CORPORATION

SOFTWARE & SERVICES

Utility's DBMS overhaul keys DP modernization

POUGHKEEPSIE, N.Y. — Entering the 1980s, Central Hudson Gas & Electric Corp., an investor-owned utility here, was having increasing difficulty providing rapid, accurate response and service both to its 285,000 customers and to its internal corporate users.

Faced with a small DP staff, more than 80% of whom had less than one year's experience; a corporate five-year plan for new systems development; 20-year-old tape systems; development lead times extending beyond reason and acceptability; and increasing demands for improved customer service by regulatory agencies, it was clear to Robert Berger, director of electronic data processing at Central Hudson, that a new approach was needed. After just three years of effort, Central Hudson's DP staff solved those problems and created in the process what it believed to be one of the most complete, flexible and responsive customer information systems in the utility industry.

At the root of Central Hudson's problems was its reliance on batch autocoder systems developed in the 1960s to process the core of the utility's customer, financial and plant accounting data. Remedies to provide on-line query to files refreshed nightly were straining under a daily load of more than 1,800 service-related calls as well as 20,000 billing, payment and main-

See **REMEDY** page 71

SOFTLINE
Scott A. Kuklin

Phase systems in gradually

Businesses are spending billions of dollars each year to implement information resource management systems. Due to their size and complex nature, these systems commonly take from five to 10 years to implement. But with a strategy in which systems are phased in gradually, the organization can have usable systems within 12 to 18 months.

The possible ramifications of improper implementation decisions on projects of this magnitude can include a doubling or tripling of the original budget, not to mention the chaos and disruption an improper decision can cause within an organization.

This article presents some critical success factors related to the phasing-in of major information management projects, which corporate MIS managers should bear in mind. Before any business decision can be made, it is necessary to gather a minimum of information, including an understanding of how the existing system functions, how the proposed system will function, the data model required to support the proposed system and the effect the proposed system will have on the organization.

Any implementation decisions made without this minimum knowledge could have catastrophic effects on the organization. Once this information is gathered, there are also organizational, cultural and technological critical factors that must be addressed.

Every system, large or small, must be

See **PHASING** page 76

Kuklin is executive vice-president of Helix Corp., located in Westlake Village, Calif.

SOFTALK
Paul Gillin
CW Senior Editor

Users group boom: Food for thought

Users groups are taking off. Based on observations from attendance at eight of them this year, it appears this concept of getting together to meet your fellow users is more popular than ever. Many users groups are seeing attendance double each year. And with their new popularity, planning has become more critical than ever.

The following, in no particular order, are some of the issues that arise most frequently:

■ Should your group be independent or vendor-sponsored? This is the most critical decision the users can make. Groups that the vendor pays for are

See **GROUP** page 75

Integration tops SI plans

GE software division plans several releases

By Paul Gillin
CW Staff

SAN DIEGO — GE Software International Corp. (SI), which has suffered from charges of poor integration and documentation of its application software packages, is planning major new releases of virtually all of its products next year with a new focus on common functions and ease of use.

Speaking at the 15th Software International Users Group held here recently, Robert Tatum, vice-president of technology at Software International, said the integration will focus on seven areas: Smart Link, Software International's microcomputer-mainframe link; common screens and transaction processing; security; Help messages; navigator aids; queries; and doc-

See **SI** page 76

- Software Research Corp. has introduced a package said to interface a variety of OA systems with IBM's Distributed Office Support System/**64**
- Digital Equipment Corp. beefs up its VAX VTX videotex software/**66**
- Database Utility Group unveiled a new version of its [Software AG of North America, Inc.] Adabas Performance Analysis System/**66**
- Index Technology Corp. announced that IBM will market its Excellerator information systems development tool/**67**
- Pansophic Systems, Inc. announced enhancements to its Gener/OI application generation system/**67**

INSIDE

Systems Software/**64**
Productivity Aids/**66**
Application Packages/**67**

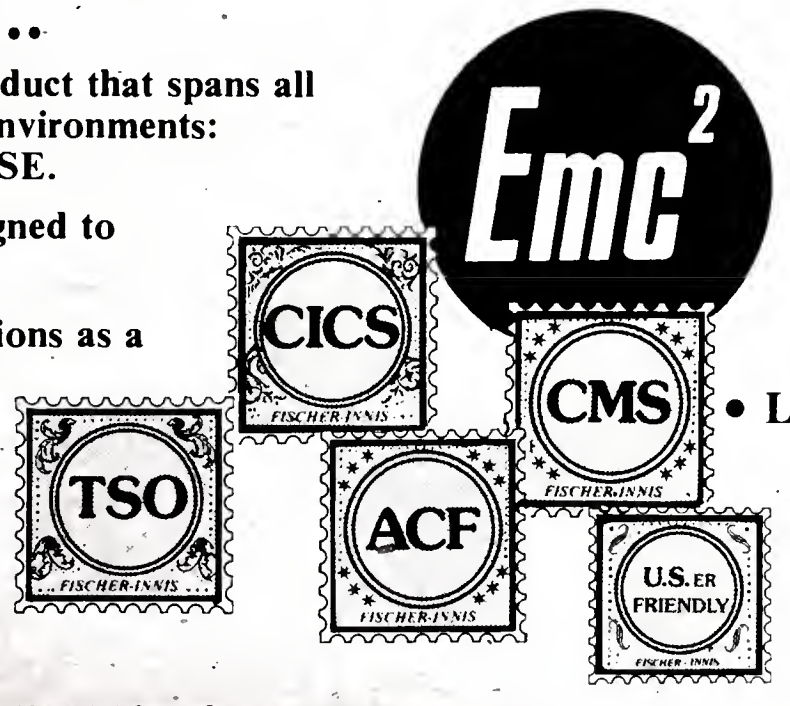
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IBM Disoss interface out

NATICK, Mass. — Software Research Corp. has introduced an IBM Distributed Office Support System (Disoss) interface software package intended for use with non-IBM office automation equipment and IBM's Disoss document library and distribution software.

Residing on an IBM host mainframe, Docupower is implemented in IBM's CICS/VS operating environment, the vendor said.

Supporting IBM Systems Network Architecture and binary synchronous protocols, Docupower enables users to format an IBM Document Interchange Architecture command from a non-IBM OA product and allow it to be interpreted by Disoss, according to the vendor.

Information dispersal

As a result, information reportedly can be disseminated to all office automation equipment linked via a network — including systems from Honeywell Information Systems, Inc., Lanier Business Products, Inc. and Wang Laboratories, Inc.

The price of Docupower is $15,000 for the first copy and $5,000 for subsequent copies.

For further information, Software Research is headquartered at One Natick Executive Park, Natick, Mass. 01760.

VisiCorp

has sold Communications Solutions, Inc. to

Control Data Software Company

a division of

Control Data Corporation

The undersigned initiated this transaction and assisted VisiCorp in the negotiations.

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SYSTEMS SOFTWARE

KISCO INFORMATION SYSTEMS
F1 Manager

Kisco Information Systems has announced F1 Manager, a disk space management package for the IBM System/36 minicomputer running under IBM's SSP operating system.

According to a spokesman, the F1 Manager spotlights inefficient disk uses and searches out poor file and library placements. It also analyzes changes in disk usage. A time analysis feature forecasts when the next disk upgrade may be required, up to three years in the future.

F1 Manager is said to leave a descriptive record of all files and libraries located on a System/36 fixed disk. When disk upgrades are installed, the package recognizes them automatically and readjusts output reports to show the expanded disk resource.

A one-time license fee is $250.

Kisco Information Systems, 120 Beverly Road, Mount Kisco, N.Y. 10549.

GRANADA SYSTEMS DESIGN, INC.
PC/Sail

Granada Systems Design, Inc. has announced an interactive IBM Personal Computer communications hardware and software product that permits communications between asynchronous devices — such as cash registers, audio response units and optical character recognition/bar code wands — and an IBM System/34, System/36 or System/38 minicomputer in a real-time, on-line mode. The communications link from the IBM Personal Computer to the IBM minicomputer is via a native IBM 4251/12 protocol.

According to a spokesman, the PC/Sail system provides the necessary intelligence and multitasking required to read data from an asynchronous device, transmit the data to the host minicomputer in real-time and, at the same time, translate the asynchronous protocol to a standard IBM 5251/12 synchronous protocol.

The package includes a Synchronous Data Link Control board, an asynchronous communications board and a diskette with the software. It is priced at $1,600.

Granada Systems Design, 303 Fifth Ave., New York, N.Y. 10016.

COMPUWARE CORP.
DOS/CICS Abend-AID

Compuware Corp. has introduced a version of its Abend-AID for IBM's 4321 or above processors and compatibles running under IBM's DOS/CICS environment.

According to a spokesman, DOS/CICS Abend-AID provides on-line access to English diagnostics explaining the cause of system abends, as well as a solution to the problem. CICS data is formatted so that no hexadecimal calculations or address chaining are required. The output is written to DOS/CICS Abend-AID's self-maintained data set. All file areas are formatted by record, and file input and output statistics are provided. The system's trace table contains only those entries associated with the abending task.

The price of DOS/CICS Abend-AID ranges from $4,800 to $7,500, depending upon the computer.

Compuware, 32100 Telegraph Road, Birmingham, Mich. 48010.

PROGRAM ACCOUNTABILITY & EVALUATION, INC.
Timer/38

Program Accountability & Evaluation, Inc. has announced a job scheduling system for the IBM System/38 running under IBM's CPF 2.0 operating system.

According to a spokesman, Timer/38 controls System/38 installations around the clock and submits jobs from powering up or down to reorganizing files.

The price of Timer/38 is $500.

Program Accountability & Evaluation, Seven Riverway Road, Salem, Mass. 01970.

AK, INC.
Trace

AK, Inc. has announced a program debugger that operates on IBM processors under IBM's MVS, MVS/TSO or VM/CMS operating systems.

According to a spokesman, the Trace debugger prints the results of the execution of machine language instructions of the traced program as they are being executed. It reportedly prints in a fixed format, including information on condition code, whether a branch was taken, contents of involved registers and contents of storage areas referenced by the instruction.

The price of the Trace program debugger is $2,500.

AK, 1671 McBain Ave., San Jose, Calif. 95125.

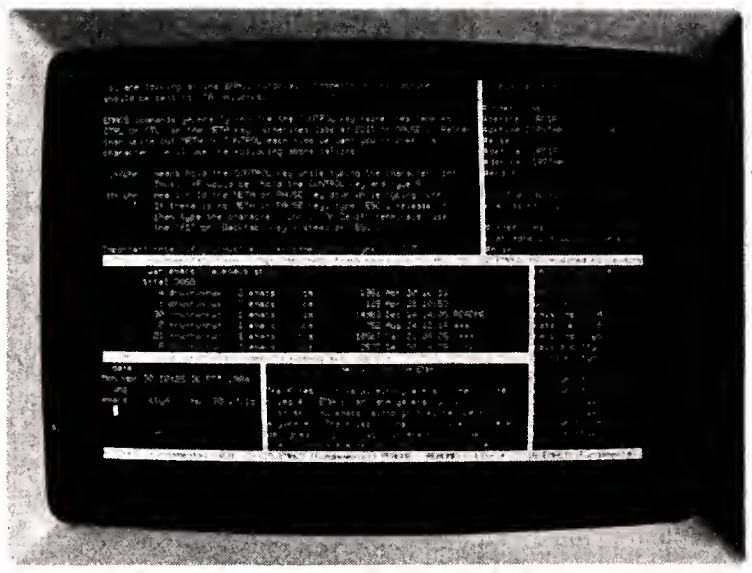
MICHAELS, ROSS & COLE LTD.
MRC-Maintainer 6.0

Michaels, Ross & Cole Ltd. has announced enhancements to its MRC-Maintainer application generator for the IBM System/38 minicomputer.

Designed for nontechnical users, the product reportedly provides fourth-generation language capabili-

Continued on page 66

CCA EMACS. THE MOST POWERFUL SCREEN EDITOR FOR UNIX AND VAX/VMS.



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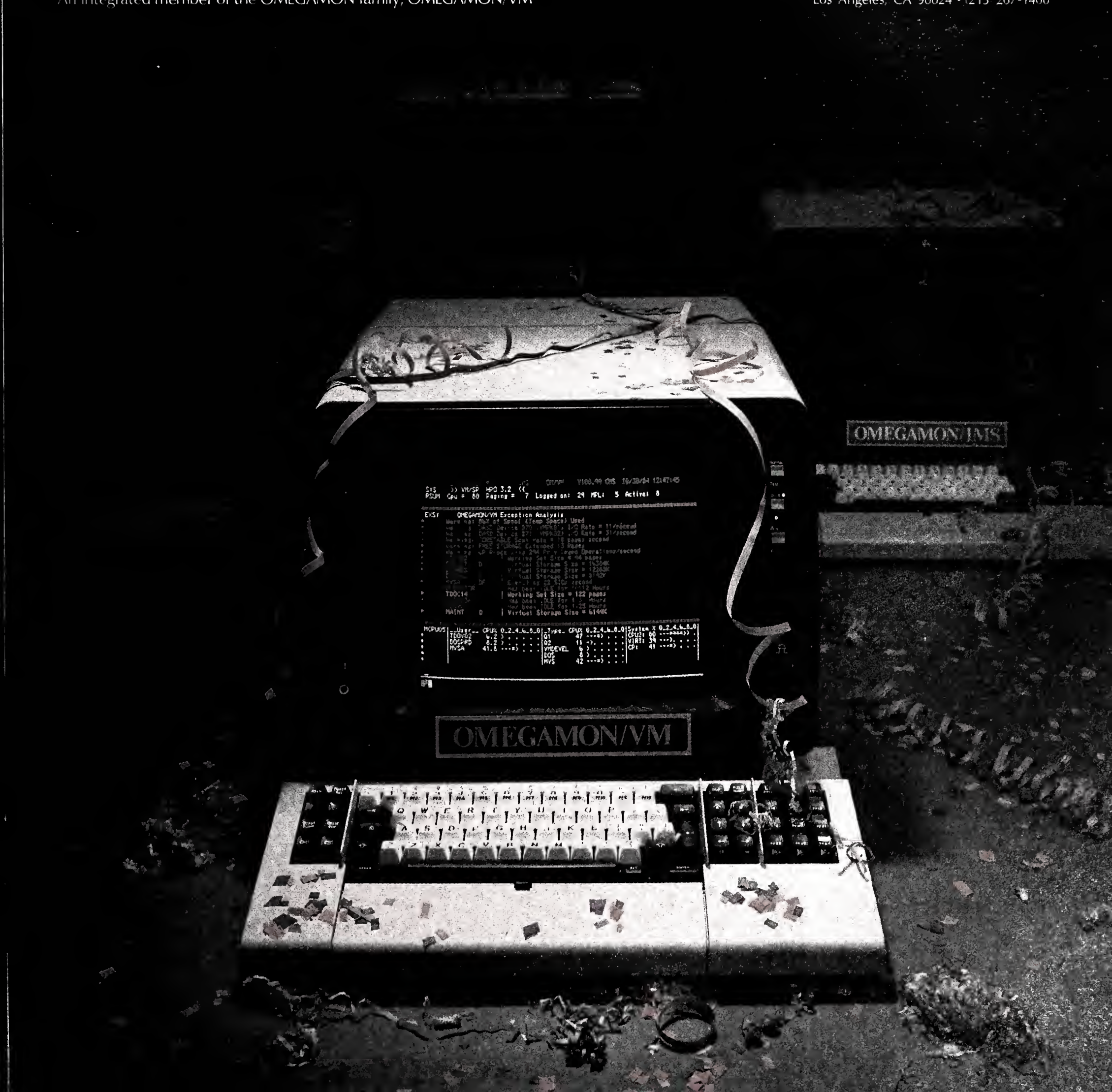
Since 1976, thousands of knowledgable companies have come to rely on Candle software products to help manage the performance and availability of their computer systems running MVS, IMS, CICS, and DOS VSE. Today, Candle is proud to announce the availability in December 1984 of OMEGAMON/VM, the first member of our VM product family. OMEGAMON VM features High Availability Design so that it continues working, even during severe hardware or software problems; Exception Analysis to warn automatically of immediate or impending threats to performance or availability; over 300 Exploratory Commands to provide a realtime "microscope" into the inner workings of VM; and a powerful set of Action Commands which properly authorized personnel can use to correct problems on the fly, thus averting system outages or serious slowdowns.

An integrated member of the OMEGAMON family, OMEGAMON/VM can share a 3270-type display terminal with up to seven other Candle Corporation realtime performance monitoring products. In this way, you can simultaneously monitor VM, MVS, IMS, and CICS on the same or loosely coupled systems from a single terminal.

Candle VM products will have the same high quality, prompt support of new IBM releases, and knowledgable, responsive technical support that Candle customers have come to expect. And introductory prices are now in effect. For more information contact your Candle representative.

Candle

Candle Corporation
10880 Wilshire Blvd., Suite 2404
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SOFTWARE & SERVICES

Continued from page 64

ties to the System/38, according to the vendor.

MRC-Maintainer features on-line Help, multifile lookup and edit capabilities, an audit trail, field editing and message file interface, according to the vendor. The program is said to work with existing System/38 data bases.

MRC-Maintainer costs $1,140 per CPU.

Michaels, Ross & Cole, P.O. Box 4533, Oak Brook, Ill. 60521.

DIGITAL EQUIPMENT CORP.
VAX VTX Videotex Software Version 1.1

Digital Equipment Corp. has announced a version of its VAX VTX videotex software that adds support for British Telecom's Prestel (Level 1) terminals and Ansi North American Presentation-Level Protocol Syntax (NAPLPS) graphics display protocols on DEC's Professional 350 workstation running PRO/NAPLPS, Sony Corp.'s VDX-1000 videotex unit and Norpak Corp.'s Mark IV videotex decoder, as well as DEC's Dectalk text-to-speech terminal.

VAX VTX videotex subscribers also can use the IBM Personal Computer as a videotex terminal using Microstuf, Inc.'s Crosstalk XVI Ascii/VT100 emulation package. VAX VTX runs under both DEC's VMS and Micro VMS operating systems and supports all of DEC's VT100 and VT200-compatible terminals.

VAX VTX Version 1.1 videotex is a multiuser, layered software product that provides distributed videotex services in a business environment.

The price of a full license for the VAX VTX Version 1.1 is $25,000, and it will be available in December 1984.

DEC, Maynard, Mass. 01754.

SYNAPSE COMPUTER CORP.
Synapse Program Generator

Synapse Computer Corp. has announced the Synapse Program Generator which works with the company's N+1 On-Line Transaction Processing System.

The product accelerates the development of Cobol transaction application programs and screen forms, according to the vendor. Synapse Program Generator is nonprocedural and only requires that the programmer answer screen prompts, the vendor said.

With the product, a user reportedly can create interactive programs that read, write and update relational data base rows; batch programs that process large numbers of data base rows; programs that create listings of selected portions of a data base; and file-transfer programs that move data from other systems to a Synapse system.

The Synapse Program Generator is priced at $7,500.

Synapse Computer, 801 Buckeye Court, Milpitas, Calif. 95035.

PRODUCTIVITY AIDS

OXFORD SOFTWARE CORP.
UFO/Cobol 1.1

Oxford Software Corp., has announced that its UFO/Cobol application generator will now work in an IBM VM/CMS operating environment.

UFO/Cobol 1.1 is said to allow the UFO Cobol programmer to develop IBM CICS applications in the VM/CMS operating environment. The new release reportedly allows the user to transfer control of UFO/Cobol programs to other CICS programs and allows a CICS programmer to communicate with UFO/Cobol programs.

A new clause allows the cursor to be positioned by field name in the program, the company said. With the enhancement, the program reportedly can do a compile from multiple libraries.

Cost of the program under IBM's CMS and DOS operating system is $24,000. Cost for IBM's OS operating system is $33,000, according to Oxford Software.

Oxford Software, 174 Boulevard, Hasbrouck Heights, N.J. 07064.

DATABASE UTILITY GROUP
Adabas Performance Analysis System 2.0

Database Utility Group has announced enhancements to its Adabas Performance Analysis System (Apas) which runs under IBM's MVS and DOS operating systems.

The product works with Software AG of North America, Inc,'s Adabas data base management system. Enhancements include fields for summarizing descriptor and field usage, user-defined fields and nucleus statistics fields for interactive display and interval reporting.

Apas reportedly features a histogram output format, an improved history system, the ability to selectively copy fields and improved recovery and operating system interfaces. Apas is priced at $8,750.

Database Utility Group, P.O. Box 4912, Federal Way, Wash. 98063.

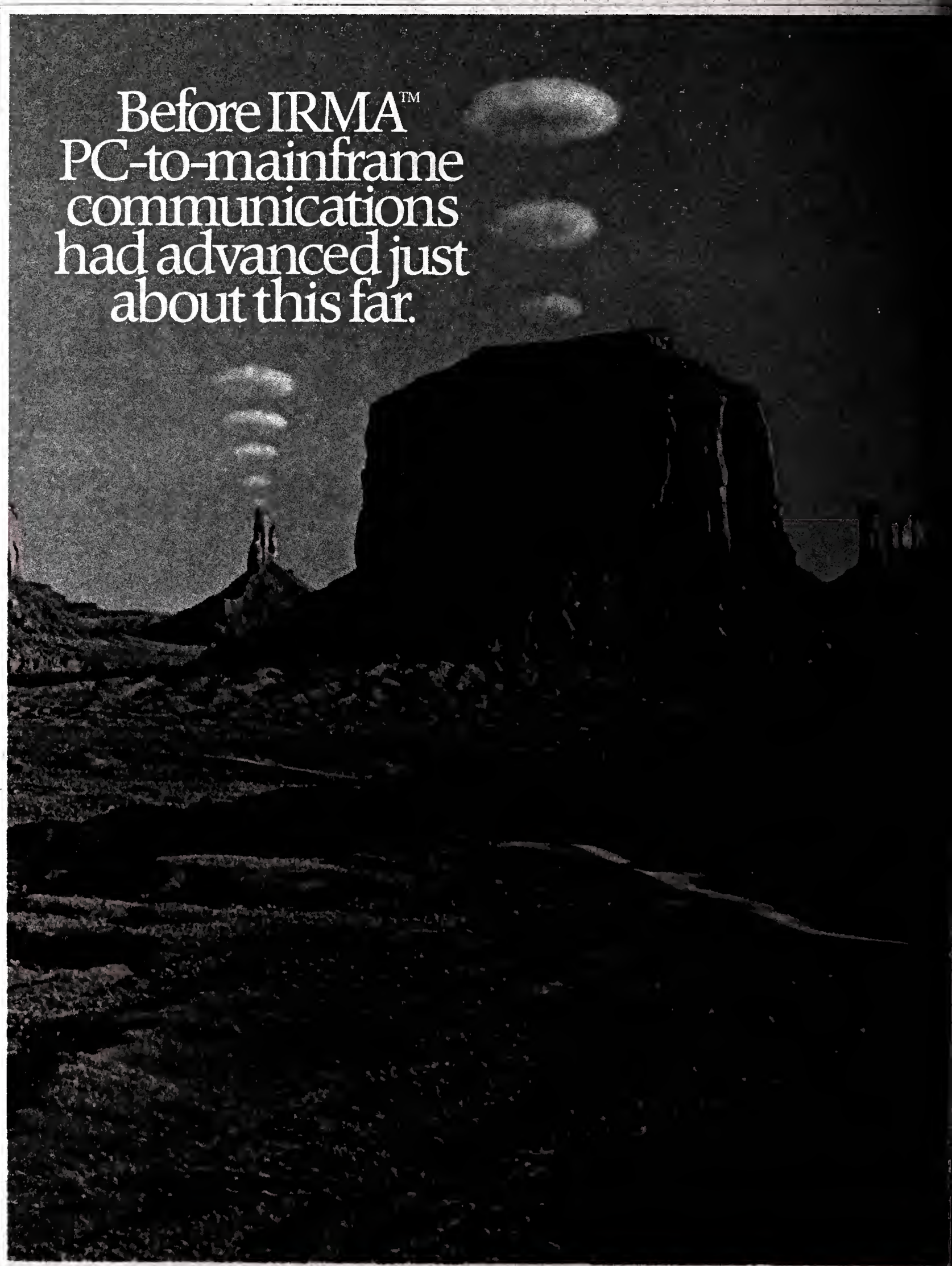
SOFT WEAR MANAGEMENT, INC.
Service/38

Soft Wear Management, Inc. has introduced a documentation and object management program for use on the IBM System/38.

According to the company, Service/38 has more than 50 commands, organized into four modules, each with its own user reference manual, providing both on-line and hard copy.

The four modules, Object Analysis, Object Management, Text Writer and Report DOC, sell for $1,275.

Soft Wear Management, 11181 Greenhurst Drive, Riverside, Calif., 92505.



SOFTWARE & SERVICES

PANSOPHIC SYSTEMS, INC.
Version 3.5 Gener/OL

Pansophic Systems, Inc. has announced an enhanced version of its Gener/OL fourth-generation language for interactive, on-line program development. Gener/OL is designed for use with IBM's 360, 370 and 4300 series and compatible computers under IBM's DOS or OS operating systems with CICS 1.5 and higher.

According to a spokesman, Gener/OL 3.5 is said to support the blending of applications written in Gener/OL with applications written in CICS Command Level, cross-referencing of maps and programs and full support of temporary storage. Additional features include a handle condition to intercept the clear key and a security system which allows multiple users to log on to a single user identification.

The enhanced version of Gener/OL is available at no cost to domestic Gener/OL users under current maintenance agreements. Price of Gener/OL 3.5 for DOS is $35,000 and for OS is $49,000.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

INDEX TECHNOLOGY CORP.
Marketing contract with IBM

Index Technology Corp. (Intech) has announced that it has entered into a contract with IBM, through which IBM will market Intech's Excelerator system for the IBM 3270 Personal Computer.

Excelerator provides facilities for analyzing, designing and documenting information systems on the 3270-PC. It allows users to develop and revise data flow diagrams, structure charts, data model diagrams and other components of a system specification document.

Excelerator's mouse-driven graphics capabilities allow users to create diagrams, and the system's presentation graphics provide for the production of documents for client or management review. In the graphics mode, the system can draw icons representing terminals, floppy disks and people.

The spokesman said all information about system design is stored and integrated through the product's data dictionary. The dictionary includes descriptions of programs and processes, data elements, data records and files. Excelerator reportedly can also transfer data to and from the 3270-PC and a mainframe or other workstations on a local-area network. Through the product, an analyst can develop an integrated system specification document, including report layouts, screen definitions and record and file layouts.

Excelerator software is priced at $8,500.

Intech, 5 Cambridge Center, Cambridge, Mass. 02142.

SOFTWARE CONNECTION, INC.
Kwic-File

The Software Connection, Inc. has developed a text indexing and search productivity aid called Kwic-File for use with Wang Laboratories, Inc.'s VS line of computer systems.

Kwic-File is said to allow users to enter certain words or phrases and retrieve all documents in the system that contain those words or phrases. The system is recommended for litigation support, as well as a bill tracking, research, credit and property records maintenance.

The price of Kwic-File is $5,000.

Software Connection, Suite 200, 5655 S. Yosemite St., Englewood, Colo. 80111.

APPLICATION PACKAGES

MCBA
Dibol Release 7

MCBA has announced that its Dibol accounting and distribution software is now available for Digital Equipment Corp.'s VAX-11 computers.

According to the company, the nine software packages that make up Release 7 of Dibol are modular, integrated systems. The package consists of accounts payable, accounts receivable, bill of materials processor, customer order processing, fixed assets and depreciation, general ledger, inventory management, payroll and purchase order and receiving.

Prices range from $900 to $4,500, depending on the hardware model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

SOFTWARE INTERNATIONAL CORP.
Fixed Assets Management enhancement

Software International Corp., has announced an on-line version of its Fixed Assets Management software package.

The new version runs under IBM's OS and DOS operating systems and is said to feature real-time edit and update of the Asset Master File. It reportedly allows users to add records to the file, update records already in the master file and inquire on the field. According to the company, an on-line Help facility is provided with the system.

The company's Fixed Assets Management System is a book and tax system that reportedly helps accounting, finance and tax personnel fufill internal and external asset accounting, property control, tax accounting and information control requirements. It includes a multicorporation, multicompany structure, asset accounting, property and locations control, depreciation projection, tax control and insurance valuation.

Continued on page 68



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SOFTWARE & SERVICES

Continued from page 67

The on-line Fixed Assets Management system is $45,600 for DOS and $47,700 for the OS. It is scheduled for delivery in February.

Software International, 1 Tech Drive, Andover, Mass. 01810.

SPERRY CORP.
Airline Revenue Enhancement Package

Sperry Corp. has announced a market analysis system for airline marketing and reservations departments.

According to the company, the Airline Revenue Enhancement Package enables airline management to extract summary inventory data from the on-line passenger service system and analyze the data using Sperry's Mapper programming language and color graphics.

The package works with either an IBM Passenger Airline Reservation System/International Passenger Airline Reservation System or a Sperry passenger reservation system running on Sperry 1100 series mainframes.

Input for all functions is done through menu selection, fill-in-the-blank screens or expert mode. The data is analyzed using predefined Mapper 1100 functions and Mapper color graphics. A series of standard functions, exception reports and situational reports are then produced, the company said.

Cost of the package is $125,000 for the Sperry Series 1100/60 and 1100/70 configurations and $137,500 for Series 1100/80 and 1100/90 configurations.

Sperry, Information Systems Group, P.O. Box 500, Blue Bell, Pa. 19424.

CENTURION COMPUTER CORP.
Service Industry System

Centurion Computer Corp. has introduced an integrated, multiuser, multitasking automation system for service contracting businesses using Centurion Series 6000 and Series 7000 minicomputers.

According to the company, the Service Industry System automates a variety of activities in service contract maintenance, including service contract preventive maintenance, service dispatch, labor and parts allocation, inventory, vehicle maintenance, job costing, accounts receivable, invoicing, mechanic time accounting, payroll, accounts payable, general ledger and financial statements.

A complete audit trail is maintained by the system on original estimates, change orders, purchases and final costs, the company said. Reports on job status, job cost, vendor invoices and weekly labor assignments are also produced by the system, the vendor said.

Service procedures are assigned standardized codes. Business not under contract is billed the same day, with a description of the performed service printed on the invoice.

Base price of the system is $12,500 and can range up to $18,000, depending on software modifications.

Centurion Computer, 111 S. Sherman, Richardson, Texas 75081.

WESTMORELAND SYSTEMS, INC.
Bar Graph Utility enhancement

Westmoreland Systems, Inc. has announced enhancements to its Bar Graph Utility for the IBM System/34 and System/36 that allow the user to set up bar graphs for display on terminals and that format the graphs for printing.

The Bar Graph Utility interfaces with the company's Calc 34/36 financial modeling system and Applications Design and Development System. Cost of the Bar Graph Utility is $300.

Westmoreland Systems, Suite 1, 228 Park Ave. N., Winter Park, Fla. 32790.

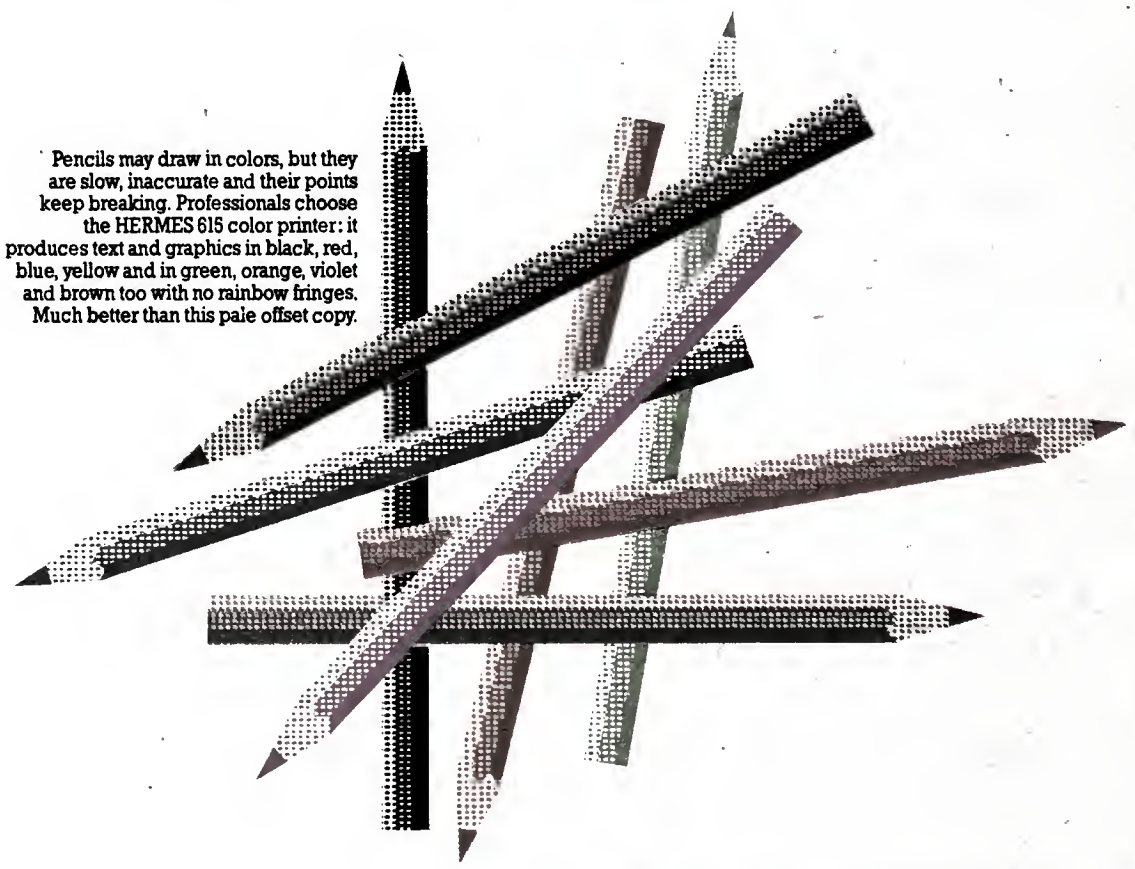
NBI, INC.
Juris-NBI

NBI, Inc. has announced an automated legal billing system for the company's 4100 series microcomputer and its clustered Oasys 2000 Personal Computing Work Station linked to an Oasys 64 central controller.

Juris-NBI reportedly provides up to 99 user-defined bill formats; four personnel-type codes; five types of billing agreements including flat-fee, standard rate, contingency, agreed and no-charge, as well as time codes, expense codes and practice class codes.

According to the company, the system allows direct ac-

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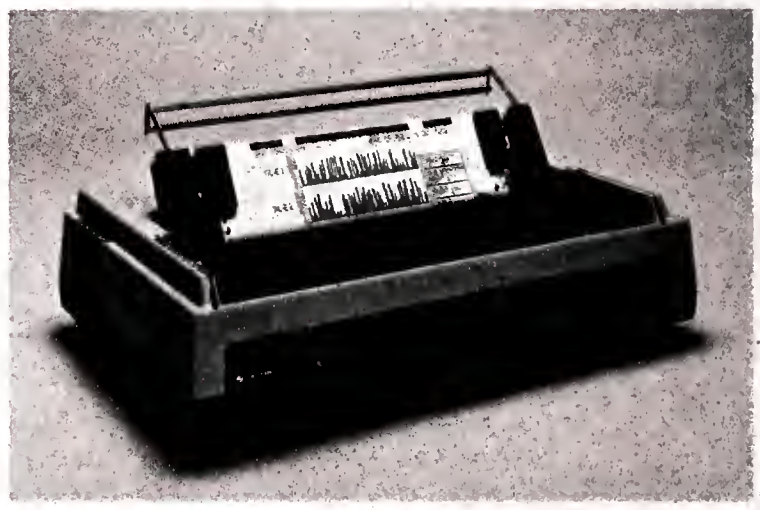
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cess to account information with client/matter master reference, cross-reference lists and client inquiries on the screen.

Through Jan. 31, the Oasys 4100 series bundled with Juris-NBI will be available for $8,999. Juris-NBI will be available for the Oasys 2000 at $4,695. The software is regularly priced at $4,500 for the Oasys 4100 series and $5,500 for the Oasys 2000.

NBI, P.O. Box 9001, Boulder, Colo. 80301.

HMS COMPUTER SYSTEMS, INC.
AIM/3000 Fixed Assets System

HMS Computer Systems, Inc. has announced a fixed assets system for Hewlett-Packard Co.'s HP 3000 series computers.

The AIM/3000 Fixed Assets System is said to maintain asset records and calculate depreciation for financial, federal and state reporting. According to the vendor, the system is code-driven and can permit local or consolidated asset management.

Transactions can be changed through the system without returning to a menu, the vendor said. Users reportedly can permit broad inquiry capability without losing control of update functions. The system is said to be fully on-line with an automatic interface to the company's AIM/3000 General Ledger System.

Price of the system ranges from $4,000 for the HP 3000 Series 37 to $12,000 for HP Series 68 mainframes.

HMS Computer Systems, 4524 E. 67th St., Tulsa, Okla. 74153.

MCBA
Payroll enhancements

MCBA has enhanced its Payroll system, which was written in Wang Laboratories, Inc.'s VS Cobol and runs on Wang's line of VS minicomputers.

According to the vendor, the enhancements include interactive state and local tax tables, expanded federal workman's compensation capabilities, a direct deposit feature and a variety of methods for handling vacation and sick hours. The package is said to allow a user to define a general ledger account number format that uses up to 21 characters and provides five levels of security.

Prices for source code licenses for the Payroll package range from $2,000 to $4,500, depending on the Wang VS model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

AMERICAN SOFTWARE, INC.
Distribution Resource Planning systems for Honeywell DPS 8, DPS 88

American Software, Inc. has announced that two of its Distribution Resource Planning (DRP-8) subsystems are now available for Honeywell, Inc.'s DPS 8 and DPS 88 computers running under Honeywell's Gcos 8 operating system.

According to a spokesman, the DRP-8 Demand Forecasting System enables marketing management to tailor forecasts according to time, geography, product, volume and dollar requirements. Demand Forecasting includes three standard modules: Basic Forecasting, Item Forecasting and Product Group and Item Forecasting.

The DRP-8 Inventory Management System consists of four modules: Inventory Planning, Distribution Requirements Planning, Inventory Deployment and the Vehicle Scheduling & Loading module.

The initial license fee for the basic DRP-8 Demand Forecasting System ranges from $20,000 to $80,000. For the DRP-8 Inventory Management System, initial license fees range from $20,000 to $65,000.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

ENTERPRISE TECHNOLOGY CORP.
Generalized Reporting System 2.02

Enterprise Technology Corp. has enhanced its Generalized Reporting System (GRS), which runs on Digital Equipment Corp.'s VAX-11 line of superminicomputers under DEC's VMS operating system.

GRS Version 2.02's query language uses one or two commands to produce formatted reports that include page numbers and column headings, according to the vendor. Data summarization statements and an advanced set of calculations allow the user to aggregate data and perform complex analyses, Enterprise Technology said.

The enhanced product reportedly supports applications written in VAX Cobol, Basic, Fortran and Dibol. GRS is said to support standard sequential, relative and indexed file structures.

GRS is priced at $6,500.

Enterprise Technology, 305 Madison Ave., New York, N.Y. 10165.

PARA RESEARCH, INC.
Accounts Receivable

Para Research, Inc. has announced its accounts receivable package designed for the IBM System/34 and System/36 minicomputers.

The product is designed for a large customer base, multiple entity businesses and small businesses.

With the product, a user can follow the day-to-day work flow of an accounts receivable department and examine customer accounts by using a customer inquiry feature that displays open items and customer balances, the vendor said.

A cash application screen displays 10 open invoices and allows the user to mark one of several for payment, Para Research said. The system will then automatically produce a balance for the accounts.

The package is priced at $2,500, the vendor said.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

See **PACKAGE** page 70

The four most important days of the new year for telecommunications users!



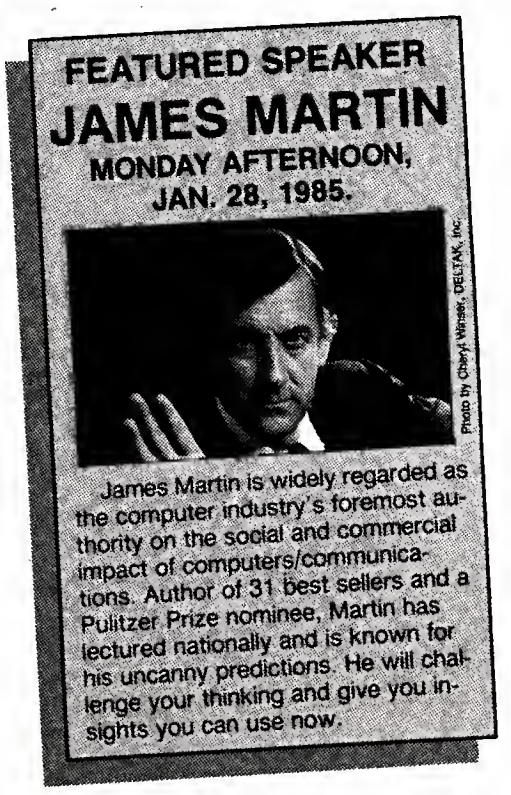
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B

SOFTWARE & SERVICES

PACKAGE from page 69

JOHN FLUKE MANUFACTURING CO.
Progen

John Fluke Manufacturing Co. has introduced an application software package to handle data acquisition, monitoring and control.

Used in conjunction with the vendor's 2452 Measurement and Control System turnkey computer system, Progen reportedly allows the user to program up to 500 I/O channels for a wide range of applications including batch processing, process control and automated testing. No programming knowledge is required to use the menu-driven Progen.

Progen enables the user to divide applications into separate parts or task groups consisting of related channels, which can then be prioritized by the user.

The software also performs scan tasks together and limit checking, and it executes predefined procedures. Errors are automatically displayed in an error file, the vendor said.

The price of Progen is $2,990.

John Fluke Manufacturing, P.O. Box C9090, Everett, Wash. 98206.

HMS COMPUTER SYSTEMS, INC.
AIM/IMS

HMS Computer Systems, Inc. has introduced the AIM/IMS inventory management system designed to provide distributors, assemblers and light manufacturers with inventory planning and control capabilities in either single or multiple locations. The software runs on Hewlett-Packard Co.'s HP 3000 series under HP's MPE operating system.

According to a spokesman, the three AIM/IMS modules — Inventory Control, Customer Order Processing and Purchasing — are compatible with the current AIM/FMS financial system. Features include the ability to move directly from one transaction to another without return to a menu; multilevel user-defined menus; screen print functions; transaction suspend/resume functions; and an end-user report writer. The system will carry along key information allowing users to access new screens without having to reenter item numbers, order numbers or dates.

The total package is priced between $9,000 and $42,000, depending upon the CPU. Each module may also be purchased separately.

HMS Computer Systems, P. O. Box 35505, Tulsa, Okla. 74153.

PDA ENGINEERING
Patran

PDA Engineering has announced that its geometric and analytical modeling package, Patran, is now available for Evans & Sutherland Computer Corp.'s PS 300 family of three-dimensional computer graphics systems. The modeling package operates on Digital Equipment Corp.'s VAX-11 under DEC's VMS operating system and on the Data General Corp. MV series of superminicomputers under DG's AOS/VS interfaced to the PS 300 system.

According to a spokesman, Patran provides solids modeling, color shaded imaging, finite element generation and analysis and results evaluation. In the Patran/PS 300 configuration, modal vibration animation generated within the PS 300 processor frees the host for further analysis, computations and other tasks. Patran uses solid and surface modeling techniques to allow definition of an engineering mode.

Price of the Patran package for the PS 300 system is approximately $10,000.

PDA Engineering, 1560 Brookhollow Drive, Santa Ana, Calif. 92705.

P-STAT, INC.
P-Stat

P-Stat, Inc. has introduced its P-Stat data management and statistical analysis software package, written in Fortran, for the Sun Microsystems, Inc. Sun Workstation running under the AT&T Unix 4.2BSD operating system.

P-Stat reportedly offers data management, data display, statistical analysis and report-writing capabilities. Features include an on-line Help facility, interactive data entry, relational data base capabilities, macros, statistical commands and expandability through a user link facility. P-Stat combines both interactive and batch processing capabilities.

The price of P-Stat for the Sun Workstation is $2,000 for the first year's license and $1,000/year for annual renewal.

P-Stat, P.O. Box AH, Princeton, N.J. 08542.

INTERNATIONAL DIGITAL SYSTEMS CORP.
RAM 12

International Digital Systems Corp. has announced RAM 12, a wholesale distributor package that runs on Digital Equipment Corp.'s Micro PDP-11 and VAX-11 computers under either DEC's VMS or RSTS operating systems.

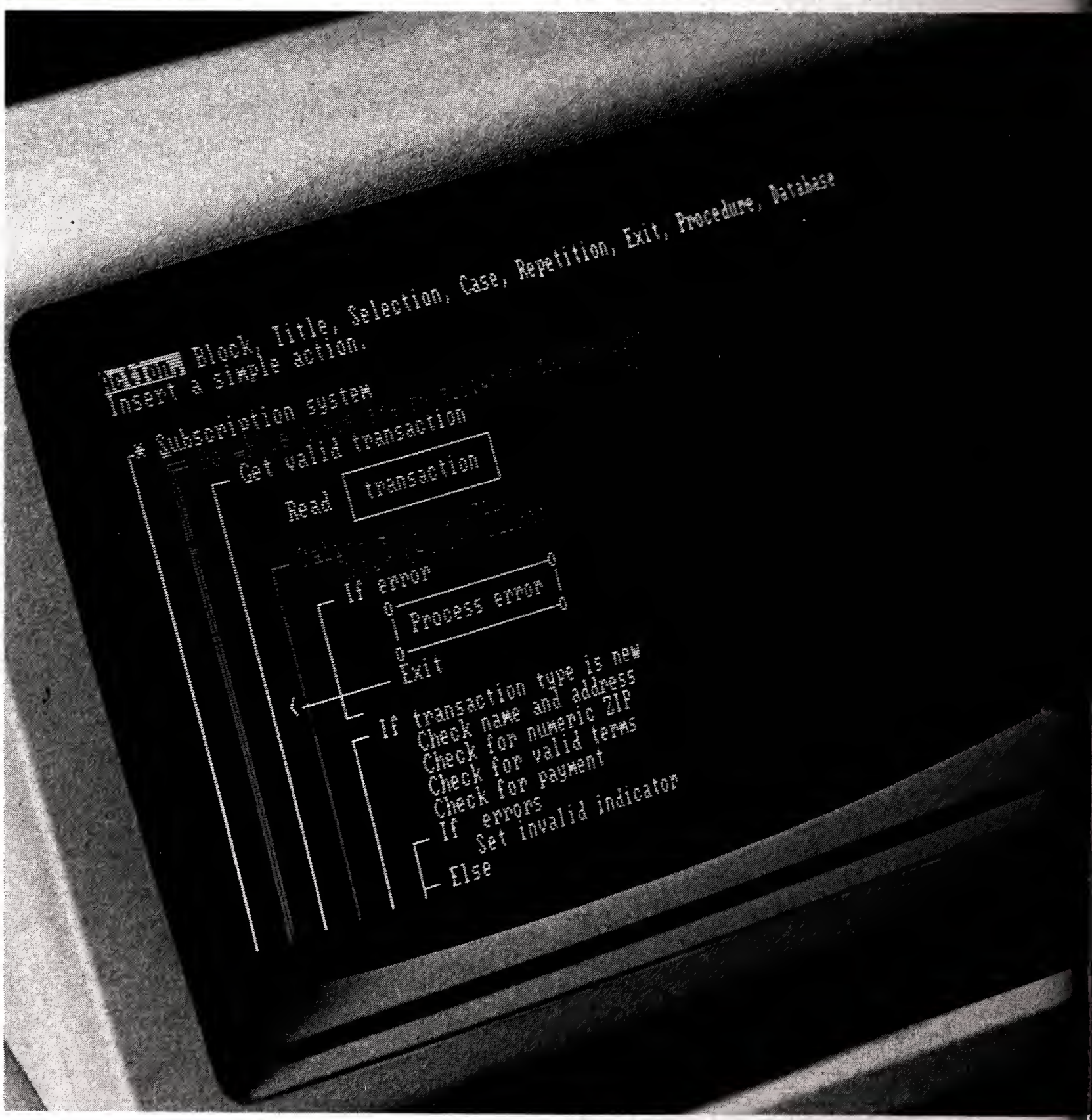
The product consists of customer order processing, puchase order and receiving, accounts receivable, accounts payable, payroll, general ledger and fixed assets and depreciation modules. It features flexible item pricing, order entry checking, inventory tracking and support for blanket purchase orders.

The general ledger system allows up to 13 accounting periods to be defined and permits transaction detail to be kept on-line for an entire year, the vendor said. The product's cost ranges from $10,000 to $30,000.

International Digital Systems, 669 E. Industrial Park Drive, Manchester, N.H. 03103.

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SOFTWARE & SERVICES

REMEDY from page 63

tenance transactions for customer data alone.

Paper-intensive routing

All processing activity was paper- and labor-intensive with routing, filing and retrieving information not only a logistical problem but also one resulting in extended delays and noncurrency of data. File updating was cyclical, ranging from one week to one month, with magnetic tape used as an interim storage medium. Verifying "check-in-the-mail" responses involved at least a 24-hour delay, followed by extended searches through transaction lists reflecting interim cycle processing.

Previous efforts over several years had failed to produce a sufficiently static environment from which to begin coding within an IBM PL/I CICS environment. Estimates for developing a Customer Information System (CIS) ranged from 60 to 75 man-years, depending on the complexity desired. Other system conversion estimates reflected the same labor-intensive requirements.

"The selection of [Software AG of North America, Inc.'s] Adabas and Natural was based primarily on their reputations for ease of use given the long training curve required for new personnel in other environments. We needed something that was quick, easy to learn and use and that could incorporate frequent changes without requiring data reorganization or recompilation of previously developed programs. Without this software, CIS alone could not have been completed with even 75 man-years of effort, given the amount of change introduced during the development cycle," Berger said.

After selecting a data base management system (DBMS), system development estimates were reduced to 20 man-years, Berger said. The final product was delivered in 27 man-years, including features not contained in the original system requirements. Overall savings, based on corporate development costs, were nearly $1.5 million.

Using the DBMS concept did not initially meet with universal acceptance. With CIS being a utility's "bread-and-butter" application, some members of management were skeptical of the introduction of so-called new technology. "That's putting it mildly," Berger said. "In some cases, there was outright hostility, and rightly so. It had been in development too long with few tangible results. As an end user, I would have had the same reaction."

With nine analysts assigned during peak development periods, CIS was started in January 1981. Extensive problems during the first several months reinforced the belief that the wrong methodology had been chosen. Working in close association with Software AG representatives and serving as both an alpha and beta test site for the new release, Natural 1.2 was implemented.

The first prototype of CIS was installed in December 1982. "We expected all kinds of problems but had relatively few. Other than streamlining a few programs, it was one of the more successful transitions I've ever encountered," Berger said. The initial portion involved replacement PL/I query programs, interfaces to the autocoder system and included customer contact processing, trouble and service call recording and follow-up, name and address changes and general inquiry capabilities. The complete CIS system was installed Jan. 1, 1984.

Most DP shops introduce new technology by starting with a small, easily managed task. However, CIS represented the largest, most important single application within a utility. Driven by user necessity, not only did Central Hudson take on CIS, but also added the conversions of the financial and plant systems in 1982 with an initial staff of three analysts.

CIS is an interactive on-line system providing prompt responses to customer inquiries; creation, scheduling and dispatching of field service orders to and from remote locations; modification of customer account information from any location with point-of-entry editing and correction; and corporatewide access to current and comprehensive consumer data.

Accounting system

Customer Accounting System is both an on-line and batch support system for CIS and includes meter reading processing, service bill calculation, payment posting, accounting adjustments to customer data, follow-up collection analysis on late and overdue payments and the generation of reports to satisfy internal, state and federal regulatory requirements. The system was designed as a highly modularized application containing more than 850 programs, some 90% of which were written in Natural. The 1982 interim system required only minor modifications to interface to the DBMS rather than autocoder fields.

End-user satisfaction with CIS is reflected by customer services office supervisors who are responsible for handling customer inquiries and complaints. The supervisors find information on customer accounts to be available in greater detail and displayed in more practical formats, permitting faster and better responses for the customer. Besides reducing the delay between the receipt and response to a request, CIS has eliminated the reams of paper that had to be filed and analyzed.

Following on the heels of CIS, the plant and financial systems were installed in April 1984, providing the first interactive on-line access to that data. The flexibility of the Adabas DBMS and Natural made the concurrent conversions possible and made a large dent in the corporate five-year plan.

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**Diagramming Techniques for Analysts and Programmers* Prentice-Hall, 1984

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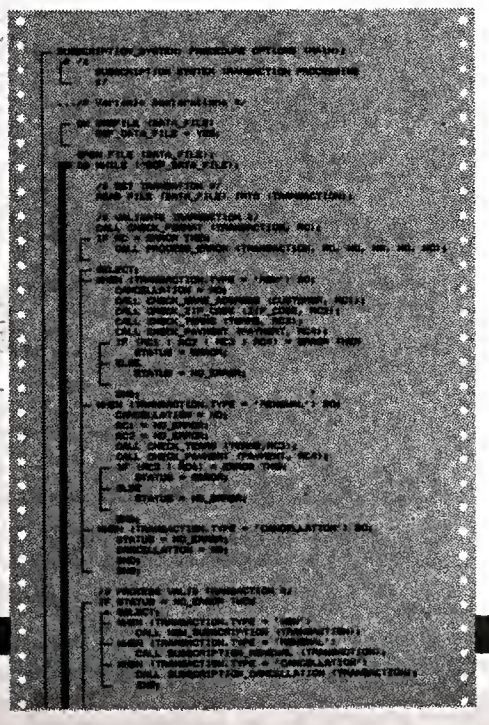
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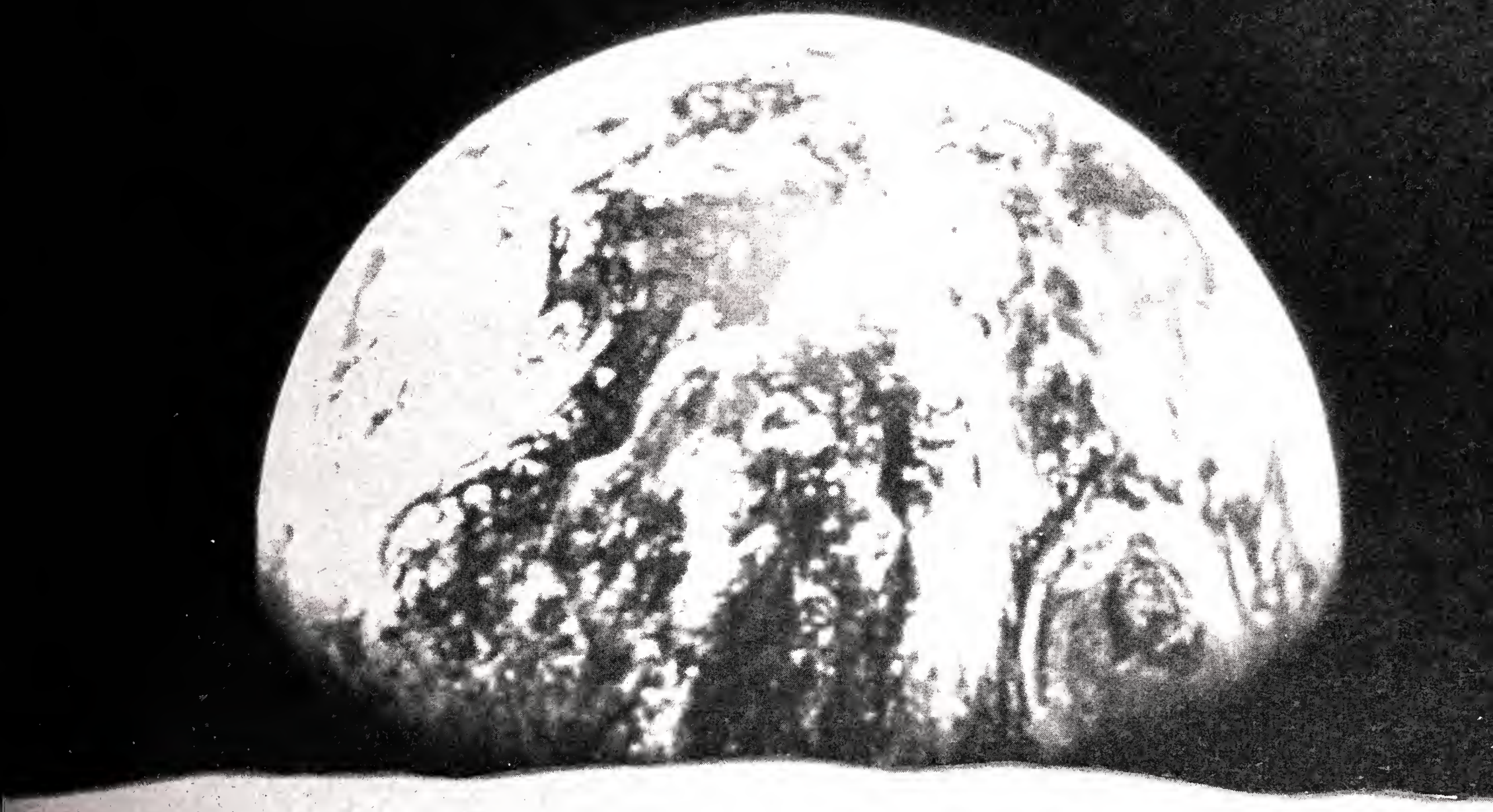
In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost $486,840.22 in 1946 dollars. Today a $2,000 kneetop portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

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SI from page 63

umentation. The major new product in this area will be a query system to be released next year. The package, which is based upon Software AG of North America, Inc.'s forthcoming Supernatural language, will eventually offer borderless query across all Software International applications. The query language will first run on general ledger files, but will be added to new releases of all other financial applications.

Smart Link capabilities will be incorporated into all financial products over the next year, Tatum said. Currently, Smart Link only supports Software International's general ledger package. Common screens and transactions are an area of particular emphasis.

"If you look at general ledger and accounts payable now, it's hard to believe they were built by the same company," Tatum said. "In the future, all screen definitions will reside externally to the applications, and we will provide tools to change the definitions to suit your shop without going into the application program."

Help screens

Help screens will be designed so that they can be loaded into customer libraries for access by programmed function keys, Tatum said. Users will be able to access a Help screen and return to the original transaction screen without losing any of the attributes of the transaction screen, a feature called "sticky cursor."

Security, navigator aids and queries will be standardized through a system manager that Software International has been employing to rebuild the on-line portion of its applications for the last 14 months.

The system manager, which includes a fourth-generation language, will make Software International applications virtually independent of a teleprocessing monitor or data base management system (DBMS). All data base interfaces will be accomplished through a set of generic calls that do not require programs to rely upon a specific DBMS, he said.

In addition, all teleprocessing-monitor-dependent calls will be removed from the system manager.

In all, Software International plans "one release next year for each major product," Tatum said. "There will be only one, and it will be thoroughly tested and documented."

Tatum acknowledged the weaknesses of past Software International release policies, which in one instance had two releases sent out less than three months apart.

"Software International was doing a very poor job in certain areas," he said. "We were developing systems without a real commitment to education. The documentation was substandard, and we didn't have a commitment to quality assurance. Releases were going out without adequate testing. I don't think management really understood the effects that had on the customer."

Aided in large part by the influx of $33 million in capital since General Electric Co. acquired it in 1982, Software International has entirely reorganized its development and support functions. Previously, Software International "was so bogged down in support activities that we weren't developing new products," Tatum said.

Under the new structure, a staff of 64 will work solely on new development. A separate staff will work entirely on customer support and maintenance. Software International plans to spend $12.2 million on documentation next year, he added.

In addition, the company will attempt to shorten the time required to convert applications from IBM mainframes to the variety of minicomputers the company supports. Previously, such migrations had taken up to one and a half years to complete.

Software International has entered into agreements with a number of smaller vendors that will perform the conversions from the mainframes to systems from Wang Laboratories, Inc., Digital Equipment Corp. and Hewlett-Packard Co.





SOFTWARE & SERVICES

GROUP from page 63

much easier and cheaper to manage, but do not offer nearly as much flexibility as those administered by users. If your goal is to learn from the vendor and to mix with other users, this may be an acceptable alternative. If you are more interested in forming a distinct body to air gripes and suggestions, the independent groups have more clout.

If you choose to go the independent path, be aware of the commitment it requires. For large groups in particular, the officers may spend as many as 50 hours in preparation during the month prior to a conference. They should also plan to meet at least two or three other times during the year for a day or more.

■ Should your group structure be centralized or decentralized? Some groups rely on local users groups to hold frequent meetings and then to consolidate concerns and observations at an annual gathering. Others hold large, semiannual, national meetings for all users. If you decide to emphasize regional groups, think about what role they will play in the annual conference. You will want to exchange ideas on running the separate groups as well as technical and management issues.

■ Should you charge dues? This is a good idea if you want to do more than just hold an annual conference. One users group, however, bypasses dues by simply planning for a surplus after its annual meeting. The windfall funds other programs during the year.

■ How do you want to communicate among members and between the users group and the vendor? An important function of a users group is to provide feedback to the vendor. The best way to compile that material is to communicate among users. Do you want to publish a newsletter? Fund an annual survey? Stick to regular telephone contact?

■ Where and when should national conferences be held? This depends largely on where the members are located. Most companies do not have deep pockets when it comes to travel budgets. It makes sense to move conference sites to various locations around the country at different times of the year so that everyone gets a chance to attend at least once every two years.

■ What do users expect from a conference? A young company will probably have many new users who are interested in more basic instructional sessions. A more experienced user base will get more out of "rap" and "helpful hint" sessions. This affects not only the makeup of your agenda but also influences how much representation you want from the vendor. Tips and techniques are better presented by other users.

■ What is the makeup of the user base? Is it mostly DP or mostly nontechnical users? Your conference agenda should reflect your audience. Make sure there is an adequate number of sessions for each group. Do not forget to include the new users.

■ Who should serve on the advisory board? These people are looking at a commitment of 20 to 100 hours each year to attend to administrative tasks. Their companies should be willing to give them the time and travel budgets to perform their duties.

It is also important that the advisory board reflects a mix of DP people, end users and new users with regional considerations also in mind. You do not want the board to be too large, but you want it to represent the concerns of the user base.

■ How should conferences be organized? The most successful meetings seem to be those that plan tracks organized around different product lines. Some attention should also be given to industry groupings — banking, manufacturing and so on. Plan for a good mix of success stories and technical sessions along with product demonstrations, previews of new releases and gripe sessions.

■ Should you invite the media? Some groups feel this is an excellent way to gain visibility for themselves and for the products. Others feel stymied and nervous when members of the media are around. This is an individual decision of your users group.

Try attending a meeting of an established users group for a product that you are considering or already have in-house. There are many excellent users groups out there.

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CONTROL DATA

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PHASING from page 63

evaluated in terms of risk vs. return on investment, both short- and long-term. Typically, information management projects are justified on the basis of a long-term payback. Unfortunately, the critical factors related to assessing the risk of a project are seldom considered. This results in risk never being quantified, causing long-term investments to be made in information management systems without understanding the implications of those investments or the real costs involved. Focus is commonly limited to technological and programming issues without regard for basic business principles.

The first and foremost problem that must be dealt with is how to phase in a system in a manner that will best support the strategic direction of the organization. Since corporate MIS managers are usually not involved in the strategic planning process, they are often unaware of strategic direction. Therefore, these strategic issues cannot be factored into the phasing in of new information management systems. Without this knowledge, the implementation could be doomed from the start. Unfortunately, this failure is sometimes only discovered after the new information management system has been in operation for several months.

The next critical factor relates to the impact of the phasing-in strategy upon the organizational structure. Common sense dictates that monolithic solutions related to the organizational structure are rarely successful. Among the reasons for the failure of such monolithic solutions are the following:

- They require tremendous organizational commitment from the board level down to be successful.
- They demand a higher degree of consensus among all the organizational entities involved.
- They take a long time to effect.
- They challenge the very foundation of the organization itself.

After all, the purpose of these information management systems is to support the business functions — not for the business functions to support the information management systems.

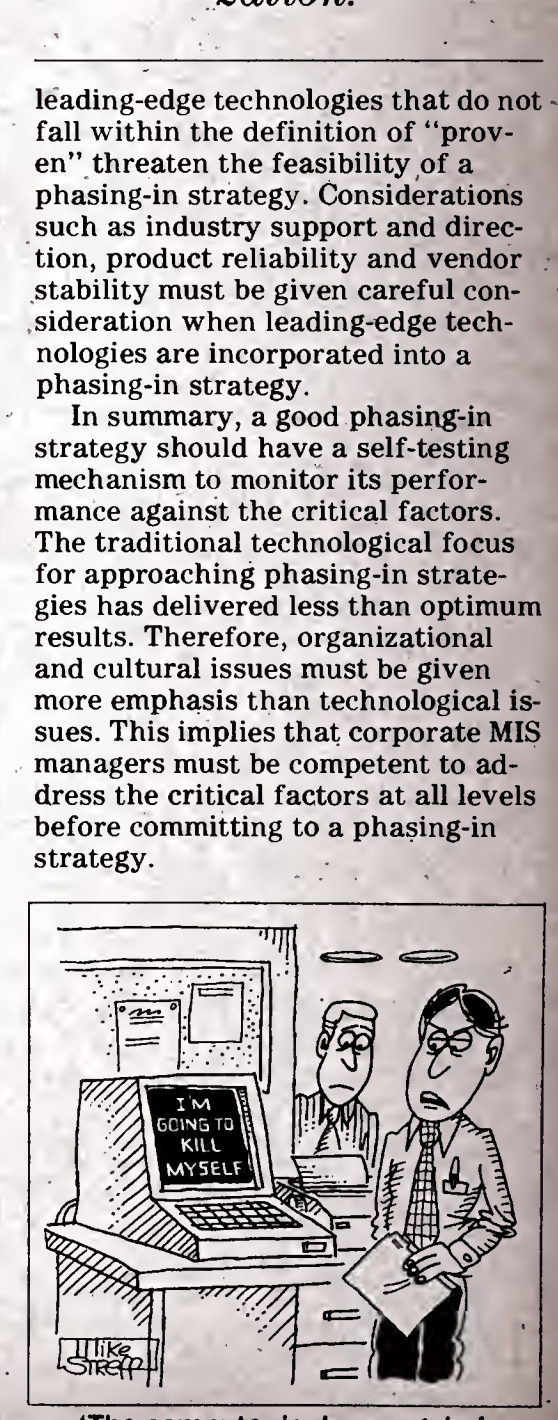
After resolving the strategic and organizational issues, cultural critical factors must be addressed. Given that the phasing-in strategy supports the strategic direction and does not severely impact the structure of the organization, the impact on the functional users of the information management system must be considered. Even the best-built information management system will fail if not embraced by the users. Therefore, the phasing-in strategy must take into consideration how to institutionalize the information management environment among its users.

The final critical factors are technology-oriented. These break down into two major categories: data base issues and equipment and software issues. The data base becomes the foundation for any information management system. It dictates how the data is inherently organized and, therefore, how it can be accessed, manipulated and extracted. Restructuring data bases is not a trivial process. Any successful phasing-in strategy must take into consideration the structural relationships of the entire information management environment.

Equipment and software issues include such things as languages, data base management systems, networking, telecommunications, hardware and so on. Proven technologies are those that have been successfully used and deployed within the public sector. Strategies that incorporate leading-edge technologies that do not fall within the definition of "proven" threaten the feasibility of a phasing-in strategy. Considerations such as industry support and direction, product reliability and vendor stability must be given careful consideration when leading-edge technologies are incorporated into a phasing-in strategy.

The first and foremost problem that must be dealt with is how to phase in a system in a manner that will best support the strategic direction of the organization.

In summary, a good phasing-in strategy should have a self-testing mechanism to monitor its performance against the critical factors. The traditional technological focus for approaching phasing-in strategies has delivered less than optimum results. Therefore, organizational and cultural issues must be given more emphasis than technological issues. This implies that corporate MIS managers must be competent to address the critical factors at all levels before committing to a phasing-in strategy.



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COMMUNICATIONS

New satellites may be fixable



DATA STREAM
John Dix
CW Senior Editor

The recent rescue of two stray communications satellites by the space shuttle *Discovery* verifies the technical feasibility of recovering communications satellites to retrofit them on Earth and hints at the future capability of repairing satellites in space.

Space-walking astronauts Joseph P. Allen and Cmdr. Dale A. Gardner left the confines of *Discovery* on its latest mission to wrestle two satellites — the 1,200-lb Indonesian *Palapa* satellite and Western Union Corp.'s *Westar 6* satellite — into the shuttle's cargo bay.

Using the craft's mechanical grappling arm and some perseverance, the astronauts bested a design oversight that left useless a mounting bracket manufactured for the rescue of the *Palapa* satellite and manhandled that bird into its nest. The recovery of the *Westar 6* was less problematic.

Both satellites have been floundering at low altitudes since their payload assist modules failed to elevate them to the necessary 22,300-mile orbit after being launched on a previous shuttle mission. In this low altitude, the satellites were impossible to use. At the proper 22,300-mile altitude, satellites obtain what is known as a geosynchronous orbit — synchronized with the Earth and appearing from the ground to be stationary. This makes the satellites available for constant use.

Using the satellites' apogee kick motors and their reaction control systems, both crafts were lowered from the 600-mile orbit they had achieved to within the 300-mile orbital ceiling of the shuttle.

It is this altitude limitation that restricts the shuttle from being used to rescue existing communications satellites that are reaching the end of their roughly eight-year life span.

The shuttle's range of flight is determined by the amount of fuel the craft

See **FIXABLE** page 80

Gandalf Data adds PACX 2000

Network switching system links workstations

WHEELING, Ill. — Gandalf Data, Inc. has announced PACX 2000, a distributed networking switching system introduced as part of its Pacxnet family of products.

PACX 2000 is said to be software controlled and designed to handle all of the networking requirements of intelligent devices such as personal computers and word processors. Operating as either a local-area network or wide-area network, it ties together workstations so they can communicate with each other and links groups of workstations in one center to another center or to the corporate mainframe, the company said.

The PACX 2000 is based on 16-bit microprocessors and employs some fiber optics. Reportedly, the device handles a standard data rate of 64K bit/sec, up to 19.2K bit/sec for asynchronous data and is transparent to data speed and code. The switch is said to allocate switching capacity based on demand.

According to Gandalf, the PACX 2000 features a menu-driven console control; network configuration flexibility; messaging to inform users of network changes; a continuous activity log for network usage analysis; and on-line maintenance.

It handles a maximum of 896 lines and costs about $195 per connection, according to the vendor.

Gandalf Data is located at 1019 S. Noel, Wheeling, Ill. 60090.

T1 system controls net parameters

IDNX allocates bandwith, reroutes clogged circuits

By James Connolly
CW Staff

NEW YORK — Network Equipment Technologies, a California-based manufacturer, recently announced its first product, a communications processor meant to be used with wideband T1 carrier facilities that incorporates automated network management.

The Integrated Digital Network Exchange (IDNX), announced here, was designed to manage digital T1 1.54M bit/sec lines carrying voice, data and video transmissions.

A key feature of the system is its ability to allocate bandwidth dynamically to voice, data and video circuits on demand and according to priorities. A company spokesman said that, for example, the system can carry large amounts of voice traffic during the day and automatically reallocate bandwidth to transmit greater amounts of data at night when the voice demand lessens.

Now installed at beta test sites and scheduled for January deliveries, IDNX also features dynamic alternate routing of circuits when an original route becomes congested or fails. Previously, that capability had been available only to public telephone companies, not on private nets.

To improve voice throughput, IDNX is said to use adaptive differential pulse code modulation to compress standard 64K bit/sec voice transmissions to 32K bit/sec and digital speech interpolation to produce an additional 2:1 compression ratio.

Digitized voice input is directly from D3/D4-compatible channel banks or digital private branch exchanges (PBX). The company said it is compatible with all major digital PBXs.

See **IDNX** page 78

■ Datapoint Corp. introduced an Arcnet interface for the IBM Personal Computer AT and terminal emulation capabilities for the IBM Personal Computer and Personal Computer XT/**80**

■ Dyna Five Corp. has introduced an eight-channel asynchronous communications module designed to be compatible with Digital Equipment Corp.'s Q-bus/**80**

■ Hayes Microcomputer Products, Inc. unveils a 2,400 bit/sec Smartmodem/**80**

INSIDE

Controllers/**80**

Multiplexers/ Modems/**80**

GTE Telemessage linked to text messaging services

STAMFORD, Conn. — GTE Corp. has announced that it is interconnecting its Telemessage voice messaging service with its Telemail electronic mail service and other text messaging services.

The connection will allow Telemessage users to deliver messages in printed form, as well as by voice, according to the company.

Conversion of voice messages to text will allow the message to be delivered to data terminals, word processors and personal computers. In addition, Telemail subscribers will have the option of having their text messages converted to voice form.

GTE's central Telemessage system will handle the conversion, polling incoming subscriber mail every hour for messages requiring conversion, the GTE spokesman said. The conversion process will be through computerized voice-to-text and text-to-voice processes. The converted message will then be routed to the appropriate electronic mailbox for the recipient to review, redirect or save.

GTE now has Telemessage service centers in Dallas, New York and Los Angeles, and plans to open centers for Boston, Chicago, San Francisco and Washington, D.C., before the end of 1984.

Voice-to-text conversion costs $4 per 400 characters, and text-to-voice conversion costs $2 per 400 characters.

GTE, One Stamford Forum, Stamford, Conn. 06904.

Distributed Logic unveils multiplexing subsystem

ANAHEIM, Calif. — Distributed Logic Corp. has introduced an asynchronous communications subsystem designed to permit Digital Equipment Corp. computer users to multiplex from 16 to 128 local or remote communications devices.

The Optimux/32DMF+ is said to be a self-contained system expansion unit with its own 20A power supply, cooling fan and four printed-circuit card slots. It is intended for use with DEC PDP-11, VAX-11 and Decsystem-10 computers.

The basic configuration includes a single Optimux/16DMF+ asynchronous communications controller and a distribution panel for connection of up to 16 lines.

The subsystem offers a switch-selectable choice of DEC's DMF32 or DH11/DM11 protocols. Throughput is enhanced by the unit's capability for bidirectional flow control and its multiword direct-memory access burst mode, according to the vendor.

It offers software-selectable data transfer rates from a minimum of 50 bit/sec to 38.4K bit/sec.

It may be rack-mounted in 19-in. cabinets or packaged in a 3¼-in.-high enclosure. It is cabled to the DEC Unibus, allowing daisy chaining of multiple controller boards and lines for connection of up to 128 lines.

The rack-mounted version with a single Optimux/16DMF+ controller and distribution panel costs $4,500.

Distributed Logic, 1555 S. Sinclair St., Anaheim, Calif. 92806.

IDNX from page 77

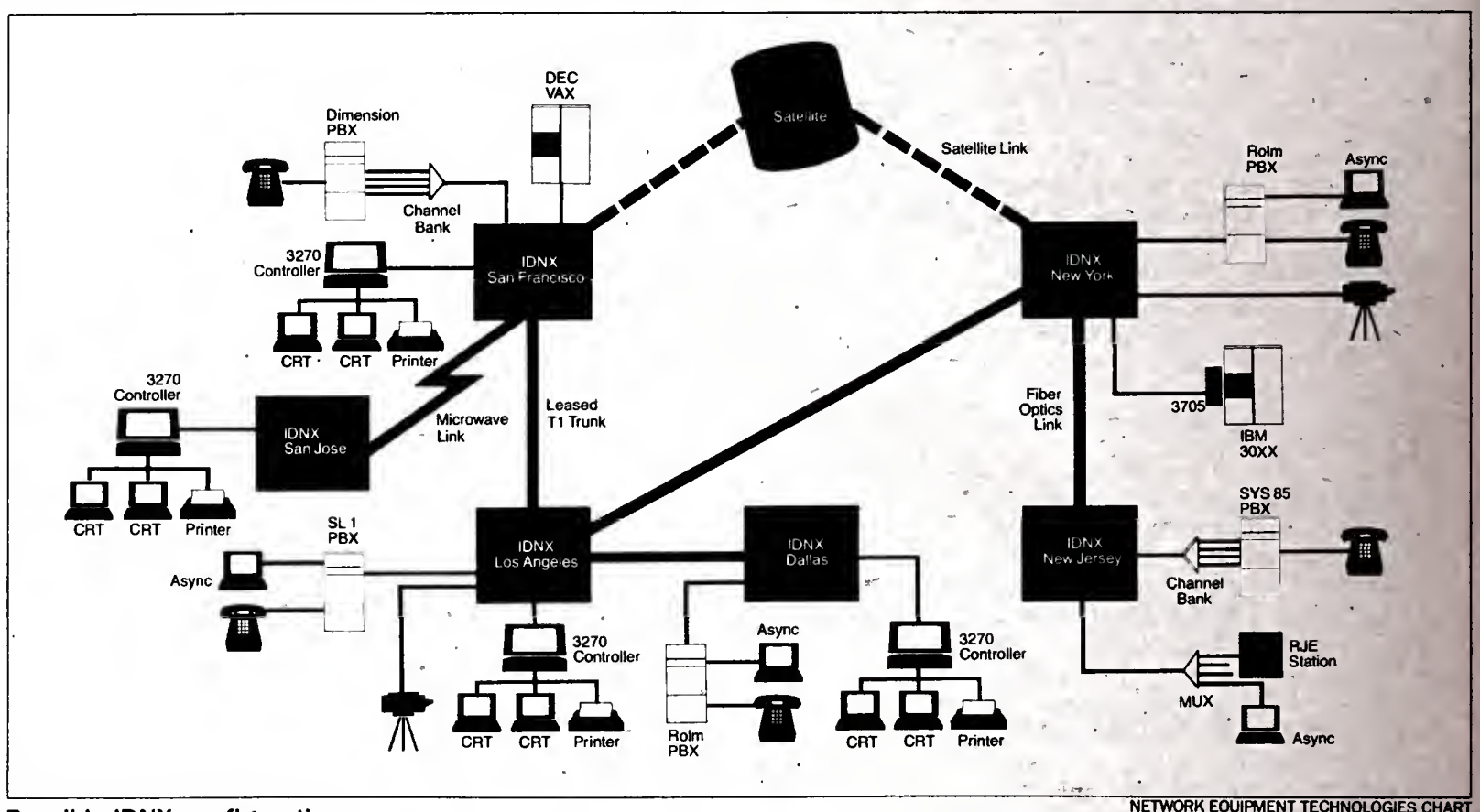
The system, targeted at large corporate T1 networks, can support up to 32 T1 trunks, with 768 addressable ports — 512 of which can be active simultaneously.

The company emphasized the system's flexibility, saying that it can be configured in many topologies, including point-to-point and fully meshed networks, with each node connected to several other nodes.

The company emphasized IDNX's flexibility, saying that it can be configured in many topologies.

Networks reportedly can be designed for the individual customer's needs, and the IDNX can be instructed to manage the network according to the customer's specifications. One such instruction could be analysis of the noise levels on a circuit and the automatic rerouting when the noise becomes excessive, a spokesman said.

The company said the IDNX includes redundant modules for all hardware whose failure could result in a node or trunk outage. Switchover to redundant hardware is said to be automatic, and installation or replacement of circuit boards in the refrigerator-size box reportedly can be done without interrupting service.



Possible IDNX configuration

NETWORK EQUIPMENT TECHNOLOGIES CHART

The IDNX is intended to replace less intelligent T1 multiplexers and is said to be compatible with T1 products and services from AT&T, the regional telephone holding companies and other common carriers. It was designed to interface with private digital microwave radios, fiber-optic and coaxial cables and satellite earth stations.

The data ports are said to support standard interfaces such as RS-232C, V.35 and RS-422/449 at synchronous rates from 1.2K to 1.34K bit/sec.

One beta test site user, Robert Anderson, assistant vice-president for telecommunications at Bankers Trust Co. in New York, said his company is using three IDNX nodes in a 60-day test. He said the test, which was half complete when the product was announced, is still at the evaluation stage and that his technicians have been examining the product's ability to withstand replacement of boards and changes in the network.

A Network Equipment Technologies spokesman said the IDNX operates at the physical link layer of the International Standards Organization Open Systems Interconnect model, transferring bits transparent to protocol between computers.

Pricing is based upon the configuration desired, ranging from $40,000 to $150,000 per node, with a typical customer paying $90,000 to $100,000 per node. Network Equipment Technologies is located at 1060 Marsh Road, Menlo Park, Calif. 94025.

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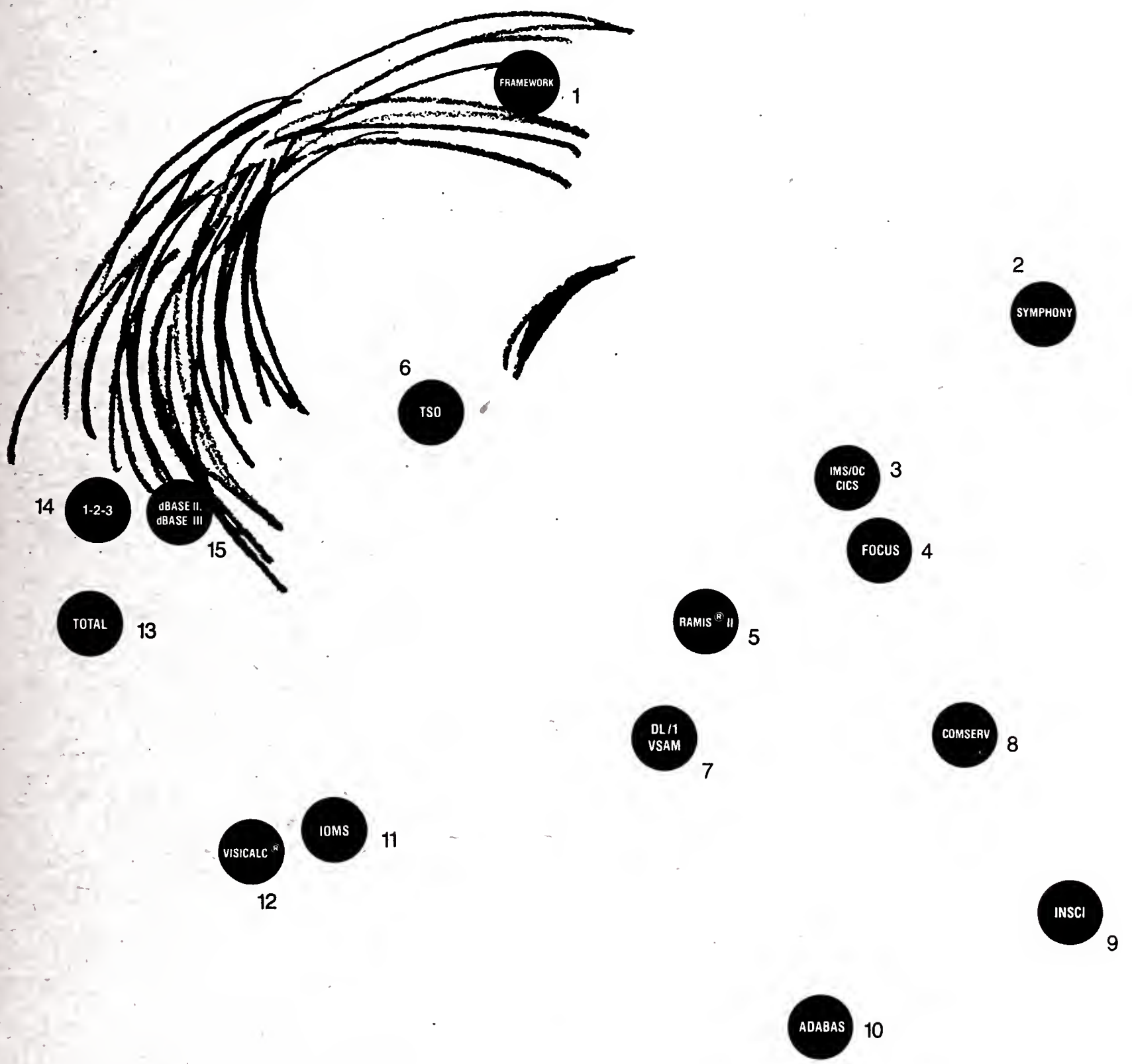


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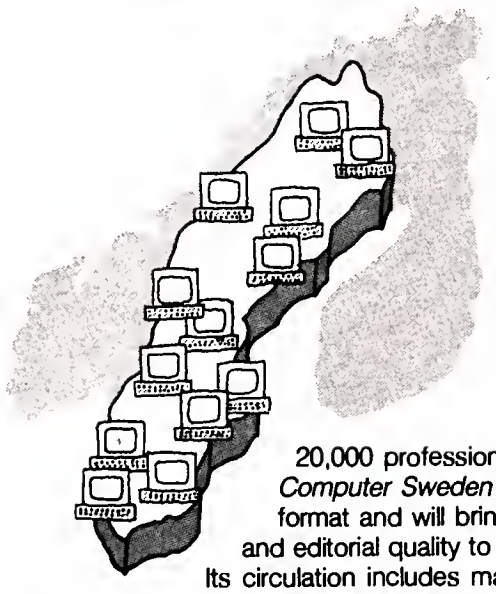
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COMMUNICATIONS

Datapoint offers support for three IBM micros

SAN ANTONIO — Datapoint Corp. has introduced a networking product for the IBM Personal Computer AT and terminal emulation capabilities for the IBM Personal Computer and Personal Computer XT microcomputers.

The Intelligent Network Executive-PC (INX-PC) is an adapter card designed to fit in an expansion slot on the AT, enabling the user to link the micro to the Datapoint Attached Resource Computer local-area network. It reportedly allows the AT to serve as an applications processor.

INX-PC is a user-installable card costing $695 and software costing $75. PC8220 is a software package that enables IBM Personal Computers and Personal Computer XTs to emulate a Datapoint 8220 terminal. It reportedly supports both Datapoint operating systems, RMS and DOS, and gives the IBM user access to Datapoint office automation software, data processing capabilities and communications resources. The cost of PC8220 software is $175.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

CONTROLLERS

DYNA FIVE CORP.
D5-CI100-8

Dyna Five Corp. has introduced an eight-channel asynchronous communications module designed to be compatible with the Digital Equipment Corp. Q-bus.

The D5-CI100-8 serial communications interface module provides 22-bit addressing and is capable of operating at speeds from 50 to 19.2K bit/sec, according to the company.

It reportedly is software- and plug-compatible with DEC's DLJVJ1 interface and allows each channel to be independently configured.

It costs $745 and is available at quantity discounts.

Dyna Five, 12040 Western Ave., Garden Grove, Calif. 92641.

MULTIPLEXERS/ MODEMS

HAYES MICROCOMPUTER PRODUCTS, INC.
Smartmodem 2400

Hayes Microcomputer Products, Inc. has introduced a 2,400 bit/sec modem, the Smartmodem 2400, that reportedly meets the CCITT V.22 international standard for 2,400 full-duplex communications.

The Smartmodem 2400 is also said to meet the CCITT V.22 standard for 1,200 bit/sec communications and to be similar to V.25, the proposed standard for autodial capability.

According to the vendor, the device meets AT&T 212A and 103 requirements and can be switched by the user between CCITT and AT&T-compatible transmissions.

Smartmodem 2400 is said to operate synchronously at 2,400 bit/sec, 1,200 bit/sec and 600 bit/sec and asynchronously at 2,400 bit/sec, 1,200 bit/sec and up to 300 bit/sec.

It features call progress monitoring, voice/data switching and the ability to set communications instructions with keyboard commands instead of with mechanical switches. The Smartmodem 2400 also features a superset of the Hayes AT command, making it downwardly compatible with the Smartmodem 300 and Smartmodem 1200, the vendor said.

Smartmodem 2400 is priced at $899.

Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

FIXABLE from page 77

carries. A National Aeronautics and Space Administration (Nasa) spokeswoman said that the agency has thought about outfitting the shuttle with additional orbital maneuvering systems to increase its range, but even then, it would only be able to reach an orbit of 600 miles.

While it was possible to pull the *Palapa* and *Westar 6* birds down from their 600-mile orbit under their own power, none of the communications satellites now in use have the necessary fuel supply to bring them down from 22,300 miles. A spokesman for Satellite Business Systems (SBS), a carrier based in McLean, Va., said that a satellite would need as much fuel to get it down from a geosyncrhonous orbit as was required to lodge it there, or the equivalent of two payload assist modules. The extra payload assist module would have to be made at the expense of satellite power and transmission capacity.

To get around this, some scientists are toying with the idea of using a "space tug," a device that would be launched from the shuttle and used to retrieve satellites, an SBS spokesman said. They estimate that such technology is still 10 years away.

By then it is possible that the satellites in orbit will have been manufactured so that they may be repaired in space, instead of having to be brought back to Earth to be retrofitted. The first satellite to be designed with this concept in mind was Nasa's *Solar Maximum,* which is used to study solar flares.

Sometime after the Solar Maximum was launched, its altitude control module failed. In April of this year, the space shuttle *Challenger* caught up with the bird, which maintains a low altitude, and swapped the bad module with a replacement component.

In the future, all domestic communications satellites may be manufactured in a similar modular manner, enabling parts like fuel pods, transponders, solar arrays and guidance components to be changed in space. This would vastly extend the life expectancy of satellites, which cost upward of $40 million or $50 million to build, and would potentially lower the cost of using satellites for long-haul communications.

SYSTEMS & PERIPHERALS

Harris releases 32-bit workstations

FORT LAUDERDALE, Fla. — Harris Corp. has announced the Harris Station 10 and Station 20 Unix-based dual 32-bit workstations, said to deliver 0.575 Whetstone millions of instructions per second processing power and incorporating the Motorola, Inc. 68010 and 68000 microprocessors.

Aimed at engineering, scientific and software development applications, the workstations support the Ethernet local-area network (IEEE 802.3) and the AT&T System V version of Unix. The workstations use multiple 32-bit very large-scale integration (VLSI) microprocessors.

The HS-10 monochrome and HS-20 color workstations operate either as stand-alone computers, graphics systems, Ethernet network nodes or RS-232 terminals for Harris superminicomputers.

Both workstations incorporate the floating-point processor and array processor options for scientific applications. A dual bus architecture reportedly enables workstation system modules to communicate with each other via the 8M byte/sec system bus, while the peripherals connect through an enhanced 6M byte/sec Intel Corp. Multibus.



Harris workstations are reportedly effective for single-user projects in CAE, research and Unix software development.

According to Harris, the single-board floating-point processor is coupled to the CPU via the 8M byte/sec bus for maximum performance. With the Ethernet option, information can be moved between workstations at a 10M bit/sec rate, the company said. Single Harris workstations or a network of workstations can be connected to Harris superminis via Ethernet with the Department of Defense's TCP/IP protocol.

A range of peripheral, memory and performance options are reportedly possible, with the 8- or 15-slot backplanes in the HS-10 and HS-20. An accelerated Intel Multibus interface in the workstations handles mass storage devices and graphics subsystems, the company said. With the multitasking features of Unix, each user can display up to 15 text windows and 16 graphics windows. The monitors feature a noninterlaced 60-Hz refresh rate.

The HS-10 features an independent graphics processor with 256K bytes of display memory on a plane of dual 128K-byte frame buffers. The HS-20 supports up to 1.2M bytes of display memory on 10 planes of dual 64K-byte frame buffers, for 1,024

See **HARRIS** page 86

Data storage: Bubble returning, optic emerging

By John Desmond
CW Staff

LOS ALTOS, Calif. — Magnetic bubble memories and optical disk technologies are capable of serious penetration into the data storage market, according to a recent study of rigid disk drives by Disk/Trend, Inc. based here.

The study, titled "1984 Disk/Trend Report," said bubble memories are now being used in many harsh environments and are being designed into selected DP systems, such as portable computers. And some nonreversible or write-once optical disks have achieved the status of commercial products, the report stated.

Write-once optical systems are capable of higher densities than magnetic recording techniques now in use, and some planned systems could provide access to a large number of optical disks under system control, with several gigabytes on each disk. While not yet demonstrated, "advocates of various types of optical disk media technologies believe that their disks will provide archival lives which equal or exceed those of magnetic media," the report stated.

Two types of optical storage systems are available: document storage and data storage. Systems for storing document images are being offered by Toshiba, Ltd. and Matsushita Electric Industrial Co. in Japan, where the report said the optical emphasis arises from the complex Japanese alphabet. While the report predicted that optical document storage will not be able to compete on a price per image basis with microfilm, it said, "The fast and convenient access to stored images provided by optical disk systems will probably create a major place for them in the emerging OA market."

Optical data storage systems are available from a variety of firms, including Storage Technology Corp. (STC), Control Data Corp., Xerox Corp., Hitachi Ltd., Toshiba and Fujitsu Ltd. The report called STC's 7600, with shipments expected in the first quarter of 1985, the most ambi-

See **DISKS** page 86

■ Genigraphics Corp. has announced three workstations based on Digital Equipment Corp. micros for producing presentation-quality graphics/**82**

■ Lisp Machine, Inc. has unveiled an artificial intelligence software development system/**83**

INSIDE

Turnkey Systems/**83**

Terminals/**88**

System streamlines GE warehouse

On-line system allows round-the-clock processing

By James Connolly
CW Staff

HENDERSONVILLE, N.C. — With an on-line transaction processing system to control in-house distribution and shipping, a General Electric Co. storage facility for lighting systems here has greatly enhanced productivity.

"We distribute our lighting systems worldwide and must, at any given time, keep track of all the inventory in our warehouse, which measures over seven million cubic feet and has thousands of rack storage locations," said Ron Painter, supervisor of Traffic Operations and Warehouse Systems at the GE Lighting Systems Department plant, which produces high-intensity discharge lighting systems.

"Each day, the warehouse receives several thousand cases of manufactured materials such as street lights, accessories, parts, industrial lights and other luminaires. These finished goods flow into the warehouse from the adjacent factory on a conveyor, and our new computer system helps control all our inventory planning, storage, recovery and distribution operations," Painter said.

GE runs its warehouse operations on a three-processor Nonstop II system from Tandem Computers, Inc. The system includes three mirrored disk drives and provides 384M bytes of data storage capacity.

According to Painter, GE chose the Tandem system for its fault-tolerant features and expandability. "With such a large inventory, we simply cannot afford to have the system go down; it must be able to run around the clock, seven days a week. In addition, as our business grows, we can simply add more processors to handle any increased load," he said.

The system encompasses desktop Tandem terminals and Electronic Magnetic Sciences, Inc. wireless terminals mounted on material-handling vehicles in the warehouse and linked to the Tandem by FM radio communications.

"The system displays all orders available for shipment on the terminal screen, as well as each shipment's weight, cubic footage and sales dollars — everything we need to know," Painter explained. "Once the operator clears an order for shipment, the system oversees retrieval of necessary materials."

At the end of the day, the system offloads production data concerning material received from

See **GE** page 88

SHOP TALK
Terry Long

Distinctions blurry between system types

The distinctions between types of computer systems is getting more and more blurred. These days, the way a system is marketed can sometimes be the only way to determine into which category it fits. For example, one vendor's supermini may be equivalent to another's low-end mainframe. Supermicros are meshing with the low end of the minicomputer range.

Some vendors, such as many minicomputer vendors, have targeted their products to a particular market niche. But sometimes, a market niche can be broadly defined, such as general-purpose systems. This appears to be the target

See **TARGET** page 84

Long is a project leader at AT&T Information Systems in Altamonte Springs, Fla.

SYSTEMS & PERIPHERALS

Lab director predicts use of 1M-bit chips by 1987

By Charles Babcock
CW New York Bureau

UNIONDALE, N.Y. — The director of an IBM semiconductor laboratory said integrated circuits will shrink below the one micron level by 1989 or 1990, and 1M-bit memory chips may appear in workstations as early as 1987.

Cmos technology is "clearly going to be the technical choice for the future," ahead of gallium arsenide or other exotic circuits, he added.

Nicholas M. Donofrio, director of the 1,800-employee, Essex Junction, Vt., lab, which is part of IBM's General Technology Division in Burlington, Vt., told 50 members of the American Electronics Association recently that the opinions he expressed were his own, not his company's.

Donofrio was instrumental in developing the fabrication process for IBM's 64K-bit memory chips. IBM is now shipping 256K memory chips and has produced its first experimental 1M-bit chips.

He predicted 1M-bit chips are less than three years away from production, and 4M-bit memory chips will come into use as early as 1992.

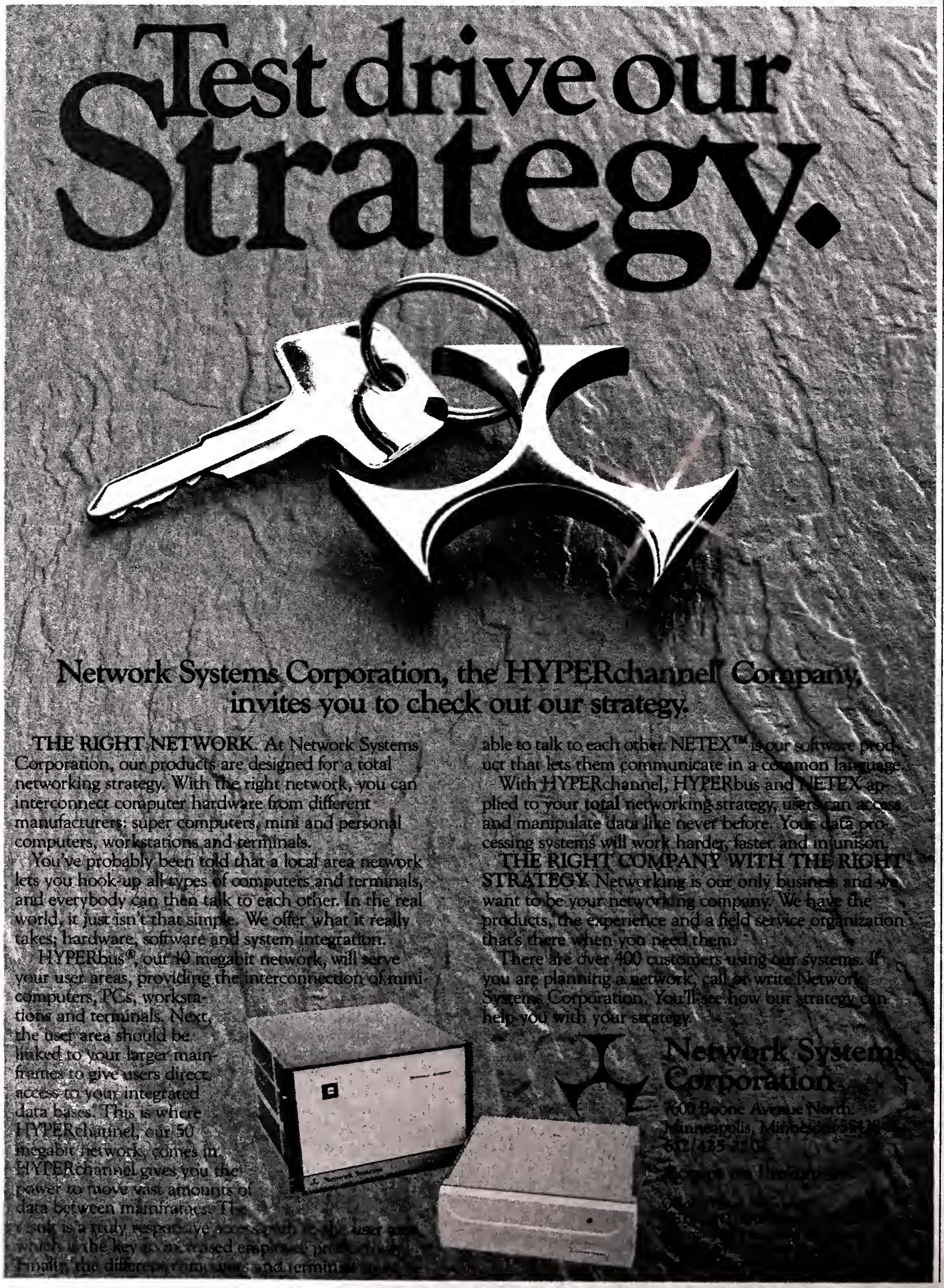
When Donofrio joined IBM 17 years ago, main computer memory cost $250,000 per megabyte. Today it costs $5,000 per megabyte, he noted. Computer users have "an insatiable appetite for memory," he added, and the number of bytes per system has gone up an average of 23% a year.

Donofrio predicted that low-power, densely packed Cmos chips will eventually replace the bipolar semiconductors currently in widespread use. Bipolar chips are faster than Cmos chips but cannot be packed with as many components and have heat dissipation problems, he explained. Cmos has already started to displace bipolar technology in logic circuits, he said.

Donofrio said there has been too little investment in developing gallium arsenide for it to come into widespread use as a semiconductor before 1990.

And while some claim Cmos chips operating as superconductors at 4 degrees Kelvin could be the next technological advance, Donofrio said he refused to believe it. "I have never found a cheap refrigerator," he said, noting that the cost of supercooling offsets the gain in speed.

Donofrio also said it was unlikely that wafer-scale technology, such as that attempted by Trilogy Ltd., was a practical alternative. Many interconnect problems exist at the wafer level that "get out of control very quickly." But growing the chip size and putting more components on each chip was a likely alternative, he said. IBM's 256K chip is 50mm compared with 15mm to 20mm for the 64K chip.



Genigraphics terminals aid graphics design

LIVERPOOL, N.Y. — Genigraphics Corp. has announced three terminals, based on Digital Equipment Corp. microcomputers, for use in designing high-quality presentation graphics for 35mm slides, view graphs and transparencies. The terminals are the SG1, 100D-Plus and SG2.

The SG1 is based on the DEC Micro/PDP-11/73 with 512K-byte main memory, the RSX-11M operating system, 31M-byte Winchester disk drive and dual 5¼- and 8-in. floppy disk drives. The SG1 comes with an ergonomically designed display with 576- by 768-line resolution.

The SG1 also comes with a palette of more than 16 million colors, three-page artwork with 256 colors per visual and 12 fonts. A communications feature enables users to transmit graphics to Genigraphics film recorders for production as 2,000- by 2,000-line or 4,000- by 4,000-line slides.

The price for SG1, with 12 fonts, Drawing Tracing Feature software and Extended Artwork software, is $95,000, the vendor said.

Six-font model

The 100D-Plus, also based on the Micro/PDP-11/73, comes with six fonts, and the Drawing Tracing Feature is optional. The product also features 5¼-in. floppy disks. Other features are said to include continuous control of hue, chroma, value, size and position; automatic justification; continuous zoom; automatic data plotting for pie, line, bar and area graphs; and file management for reading, writing, adding, reviewing and copying records. The price for the 100D-Plus is $72,000, vendor said.

The SG2, based on the Micro/PDP-11/23+, is offered with a 512K-byte main memory, 10M-byte Winchester disk drive and dual 5¼-in. floppy disks. An 8-in., single-drive floppy is optional. The price for the SG2 is $35,000, the vendor said.

All of these products are scheduled to be available in December 1984, according to the vendor.

More information is available from Genigraphics, 4806 W. Taft Road, Liverpool, N.Y. 13088.

SYSTEMS & PERIPHERALS

Lisp compact announced

LOS ANGELES — Lisp Machine, Inc. has announced Lambda/E, a compact Lisp machine designed for expert systems and artifical intelligence software development. Lambda/E is the seventh member of the company's family of Lisp machines.

Lambda/E reportedly features a 32-bit Lisp processor, 128M bytes of virtual address space, a 17-in. 1,024-by 808-pixel monochrome display, 2M bytes of physical memory and 140M bytes of hard disk memory.

Other options include memory boards, a 60M-byte cartridge tape drive and an interface to the Ethernet local-area network.

Lambda/E costs $52,500, the vendor said. Deliveries are scheduled for the second quarter of 1985.

More information is available from Lisp Machine, located at 6033 W. Century Blvd., Los Angeles, Calif. 90045.

TURNKEY SYSTEMS

OPTICAL BUSINESS MACHINES, INC.
Dataflex

Optical Business Machines, Inc. has announced a superminicomputer-based system called Dataflex, built around the Perkin-Elmer Corp. Series 3200 superminicomputer.

Dataflex is intended for sophisticated, time-sensitive applications in commercial and government environments, according to the vendor. Typical Dataflex applications are said to include piecework payroll, time and attendance recording, subscription fulfillment documents, turnaround billing applications, surveys and various typewritten documents.

The 3200 reportedly has the capability to process multimedia data input from optical character readers (OCR), bar-code wands, hand-held OCR wands and direct data capture equipment such as cash registers, electronic meters and instrumentation devices under applications software control. Another feature in-

Continued on page 88

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TARGET from page 81

market for IBM's Series 1 and Digital Equipment Corp.'s VAX-11/780.

Machines may be targeted for scientific or commercial applications, as are the Hewlett-Packard Co. HP 1000 and HP 3000, respectively. Some minis are positioned for specific applications like laboratory instrument data collection, manufacturing, robotics, medicine or office automation.

Matching the application

While a general-purpose machine is generally a safe choice, it may not be the one most suited to a particular application, nor the most cost-effective. Scientific machines are classified as such for their number-crunching ability and support for laboratory devices. They are appropriate for applications that have a tendency to become CPU-bound, such as statistical modeling, simulation and research applications.

Commercial machines are noted for their capacity to handle transaction processing or I/O-bound operations and perform well for such applications as billing and inventory. Machines targeted for business applications may come bundled with application-specific software or equipped with specialized hardware interfaces. Third-party vendors offer minicomputers packaged as turnkey systems that they will maintain and update.

The goal of any data processing application is to meet users' needs. This is only possible when the hardware and software used for the system are equal to the job. Hardware and software that fit the applications for which they were intended are also a real morale boost for system programmers and analysts. The only way to prevent such a catastrophe is to know the application and the hardware well.

The following are some suggestions that will help to determine whether a particular machine meets particular requirements.

■ Identify current application requirements in terms of the maximum number of concurrent users, required response times, size of the largest data base, size of the largest disk file, size of the largest program, interface requirements to other hardware and required software such as compilers, utilities and vendor-supported application packages. Be sure that the application planned for the minicomputer is not really a job for a mainframe.

■ Project the growth of the application. Does the vendor offer upward compatibility or will the choice to be made now imply a costly conversion in the future?

■ Compare the functionality with cost. Know what is available on the market that meets the requirements.

■ Know the training requirements for users and DP personnel. Calculate the costs in terms of time and money. If possible, match the machine software to the skills of existing personnel. Users generally are more satisfied if they can solve some of their own DP problems rather than contribute to the existing application backlog.

■ Consider the level of vendor support required and whether the vendor will be able to provide it. A vendor's reputation for support is not always consistent across all geographic locations. If you are running a 24-hour-a-day operation and production is dependent upon the uptime of the machine, be sure that you can depend on the vendor for parts and service 24 hours per day.

■ When you have narrowed your choice to several pieces of hardware, request a benchmark. Benchmarks do not necessarily have to be difficult to construct. In lieu of a benchmark, ask the vendor for references of companies that are using his equipment in a way similar to the one in which you plan to use it.

■ Does the system meet all or most of the requirements? Are the needs that it does not satisfy noncritical to the applications? One way to decide this is to prioritize the requirements in categories.

■ Can the vendor meet the delivery date? Will the machine be installed soon enough to meet the company's business needs? The second or third best machine in terms of meeting the requirements may turn out to be the optimal choice if the vendor of first choice cannot respond to needs quickly enough.

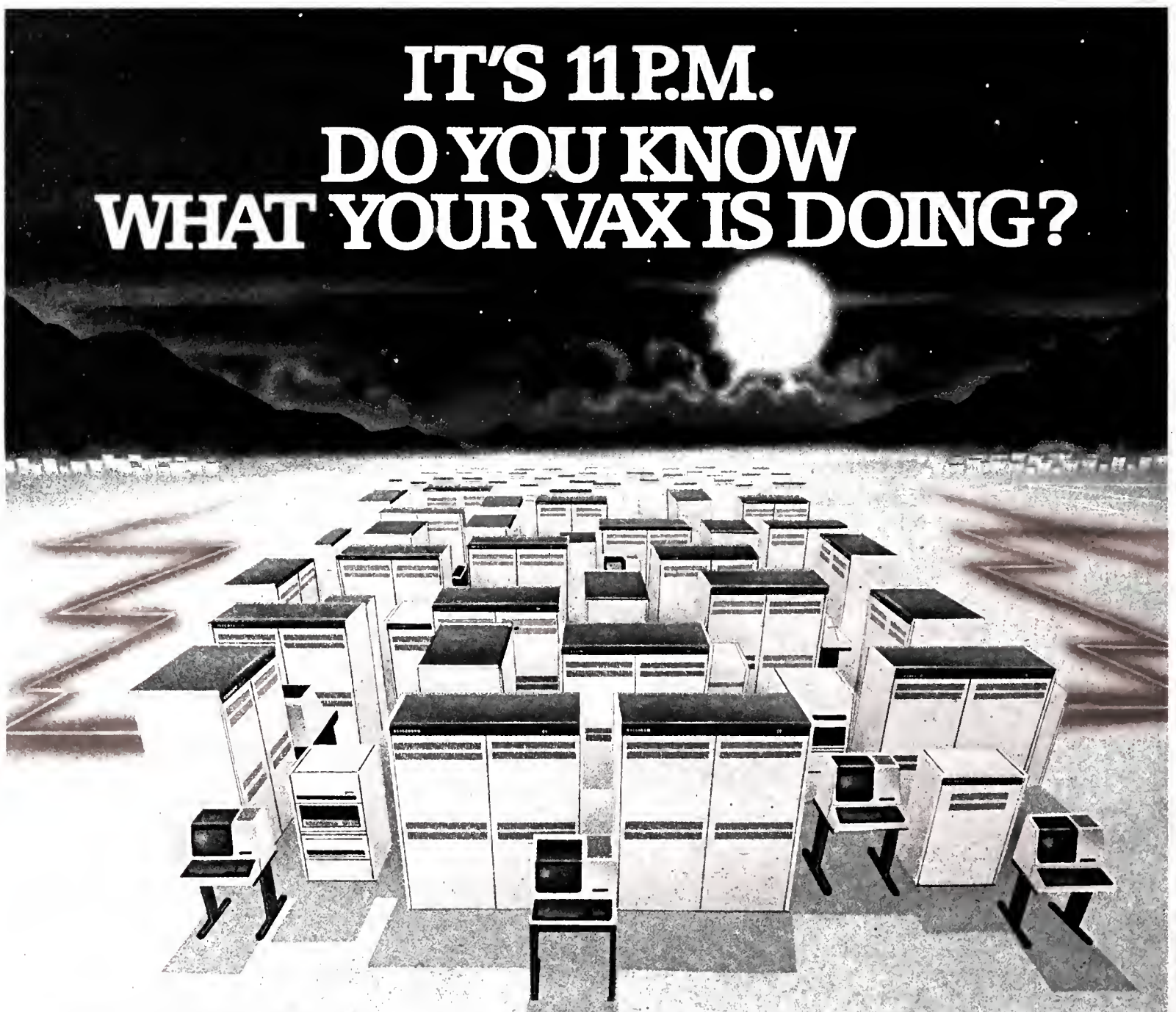
■ Do not choose a computer system because of a positive bias for a favorite vendor. Blindly purchasing from a familiar vendor may not always result in the effective solution of a business problem.

■ Do not take sales brochures at face value. A system that is advertised to support 30 users may support only 15 under certain types of applications.

■ Do not use a vendor demonstration of a machine as a benchmark. Demos are designed to show only machine strengths. The best benchmarks are those that most closely approximate the job mix that will be running once the machine is installed in house.

The best overall view of machine performance will come if the benchmark is run in four phases. First, run all the jobs single-threaded on an unloaded machine. Second, run a mix of the jobs that represents the average machine load. Third, run a mix of jobs that would represent an extremely heavy load. Fourth, run as many jobs as are required to bring the machine to full-load capacity. Then compare the results of step four with figures for projected growth to estimate the lifetime of the machine.

Vendors generally have software to simulate any number of users and can help in constructing a script that will represent a particular machine load. They may be able to provide performance statistics as jobs run.



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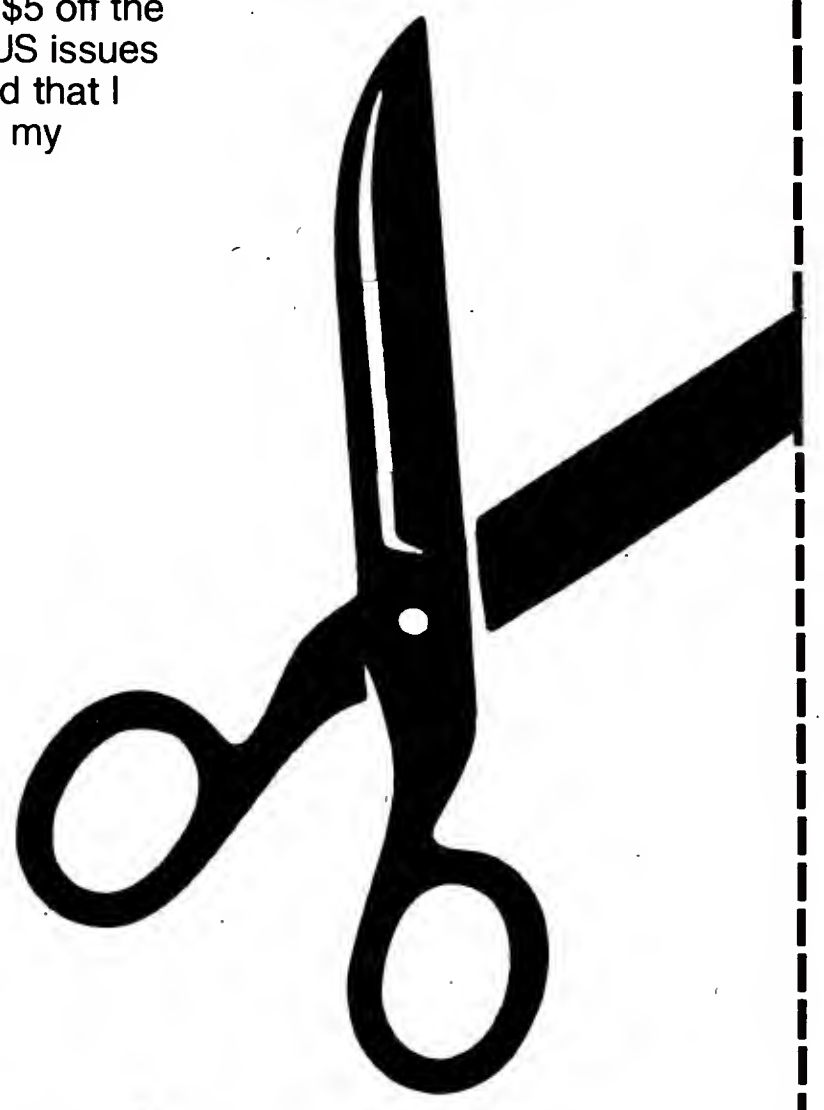
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SYSTEMS & PERIPHERALS

DISKS from page 81

tious of these. The 7600 subsystem has a transfer rate of 3M byte/sec, the same as IBM's 3380 magnetic disk drive, the report said. STC has identified an optical storage market in data bases that are infrequently or never updated, such as stock market history and legal files, as well as a market for replacing magnetic tape for archival storage, according to the report.

Delivery of 7600

Despite the recent announcement that STC has filed for a reorganization under Chapter 11 of the Federal Bankruptcy Act, the company still plans to release the 7600 on schedule, according to an STC spokesman.

Technology for the erasable optical disk is making progress, the report stated. Most development programs involve either use of a low-power laser to change the state of an amorphous gadolinium coating on a disk or use of a polarized light to change a different type of amorphous coating from a crystalline state to a noncrystalline state.

But the first volume shipments of erasable optical disk drive systems may take another three to five years, because no firms have yet committed the heavy investment required, the report said.

Despite the loss of credibility after the 1981 departure of National Semiconductor Corp., Texas Instruments, Inc. and Rockwell International Corp. from the magnetic bubble memory market, the bubbles "now look like a product with a future," the report stated. Portable computers offer the largest potential market because the bubbles have the advantages of physical size and durability while being transported, the report suggested.

Bubble memories are also attractive in applications such as industrial control systems, robots, point-of-sale terminals, medical instrumentation, avionic systems and militarized systems, according to the report.

Other highlights

Other highlights of the report were the following:

■ The most likely product to replace certain rigid disk drives is the high-capacity flexible disk drive, the report stated. The 3.3M-byte, 5¼-in. floppy media being shipped by Drivetec, Inc. and Eastman Kodak Co. are developing markets with specialized systems and as personal computer add-ons, according to the report. And such media may double its capacity to 6.6M bytes next year, with the potential for even more expansion.

■ Perpendicular recording for flexible disks has the potential to increase the capacity of a 5¼-in drive to 5M to 10M bytes, the report said. Linear densities of up to 50,000 bit/in. are predicted, but media availability will be a limitation on the market.

■ The use of very small magnetic particles could result in isotropic magnetic recording, in which more flux changes per inch can be obtained. Eastman Kodak's Spin Physics subsidiary is advocating this technology, the report stated.

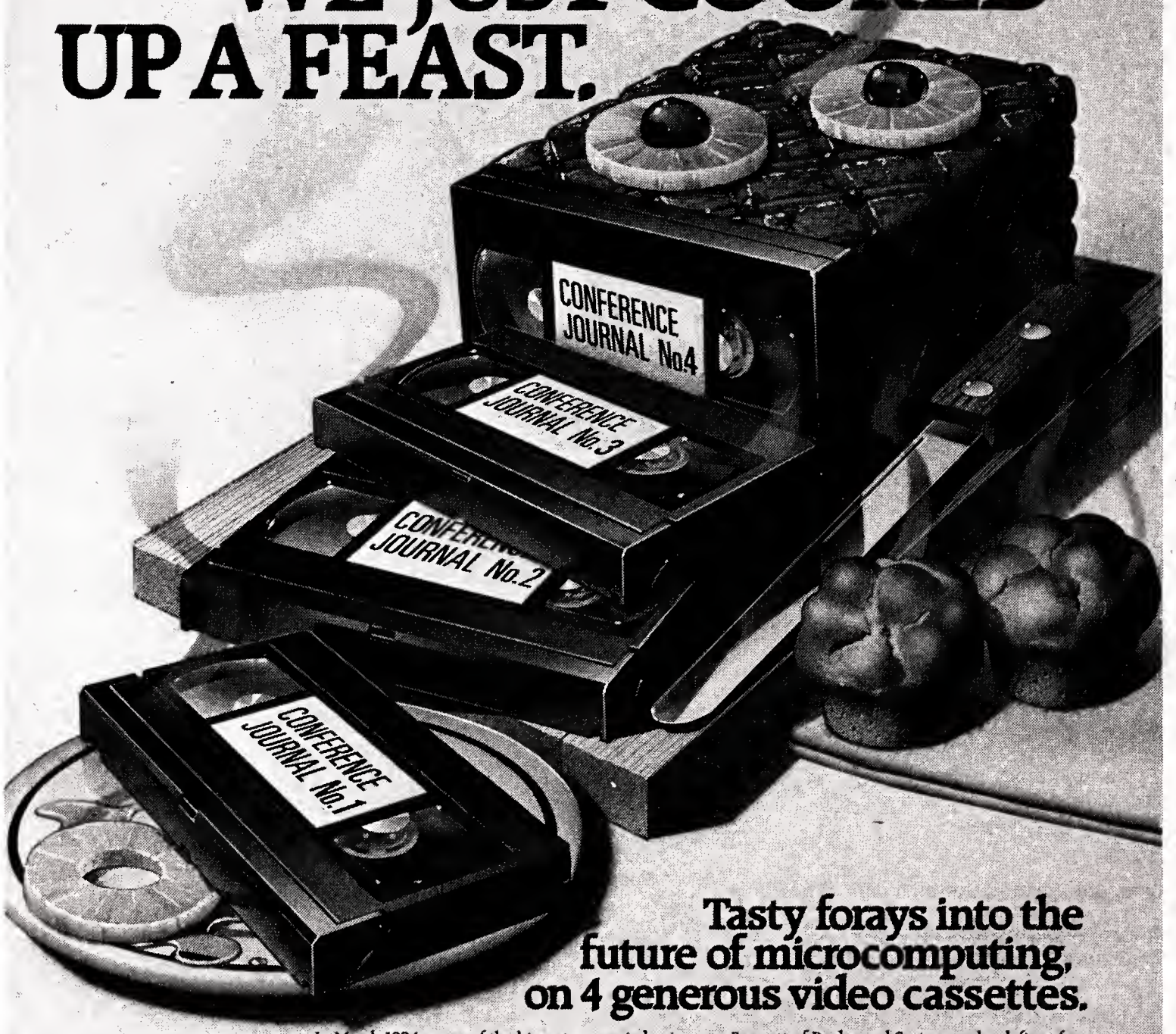
■ The potential is great for track/in. improvements. "The industry still has plenty of room for innovation in this area," the report said, since most disk drives operate below 500 track/in., and the highest performers operate at approximately 960 track/in. The report predicted that IBM will release a double-density version of the 3380 in the first half of 1985, with at least 1,400 track/in.

■ Perpendicular recording, as opposed to longitudinal recording used by all disk drives today, has untapped potential. If magnetization were oriented in a plane perpendicular to the recording surface, the potential would be at least 100,000 bit/in., the report said. The Japanese are developing perpendicular recording, and CDC in the U.S. has a license for the technology.

The report on rigid disk drives, which is designated Volume I, is available for $1,015, and a report on flexible disk drives, Volume II, is available for $775. The price for both reports is $1,530. More information is available from Disk/Trend, Suite B-20, 5150 El Camino Real, Los Altos, Calif. 94022.

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HARRIS from page 81

color combinations, the company said. Six planes of display memory for 64 color combinations are standard in the HS-20.

The independent graphics processor is a Motorola 68000 microprocessor with 128K bytes of random-access memory. Each one uses high-speed direct memory access transfer to obtain graphics commands from any area within the system's memory.

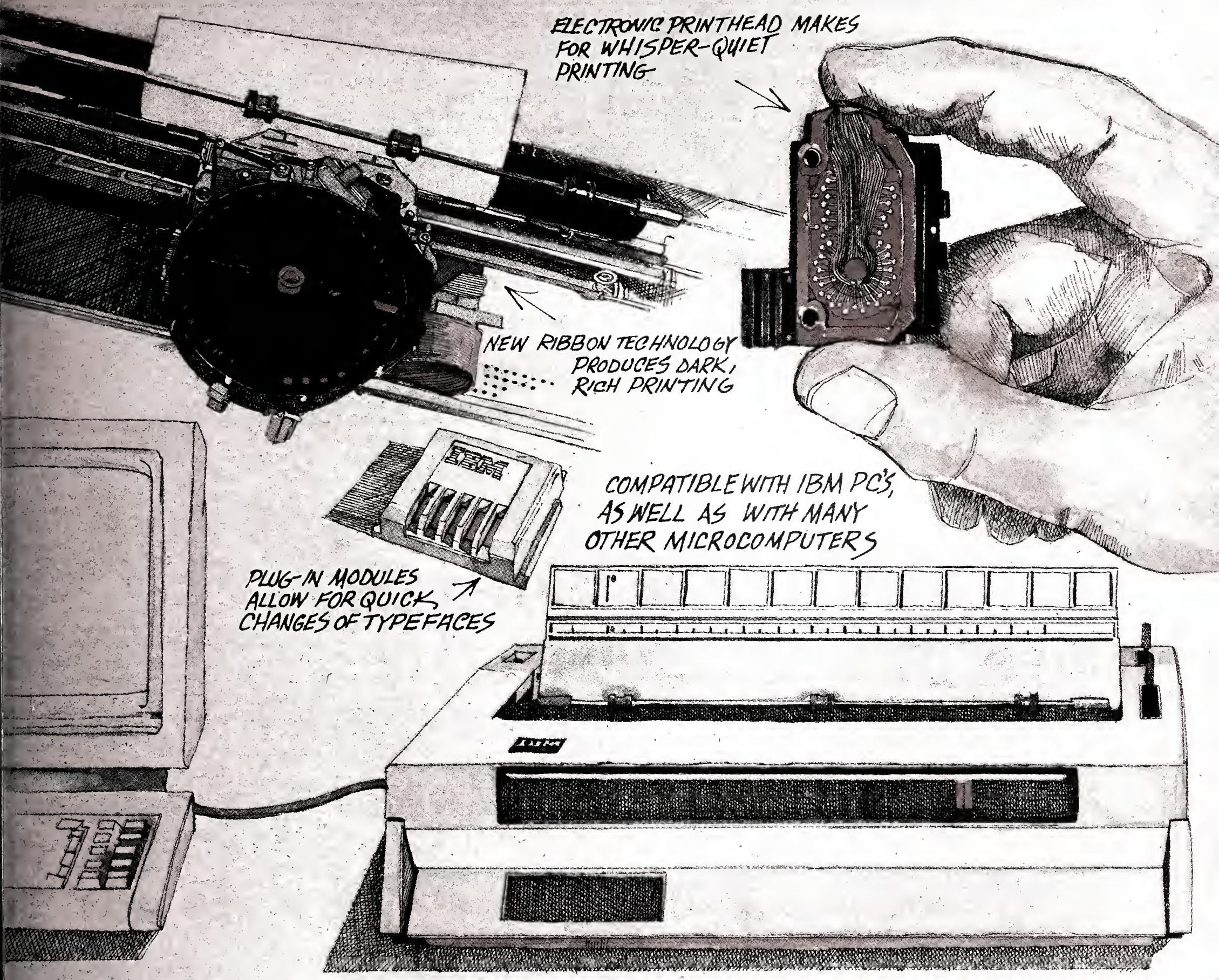
Computer-aided engineering applications include two-dimensional drafting and three-dimensional design, printed-circuit board layout and routing, VLSI circuit and gate-array design, civil engineering architecture and mapping, the company said.

A stand-alone unit includes the 32-bit CPU with three RS-232 lines, 1M-byte of memory, independent graphics processor, a 50M-byte disk drive and 45M-byte cartridge tape, AT&T's Unix with Fortran 77 and C languages, 19-in. monitor and an 8-slot chassis.

The standard HS-10 includes a monochrome graphics subsystem with a 19-in., 1,024-pixel by 800-pixel monitor. The HS-20 features color graphics with a 19-in., 832-pixel by 600-pixel monitor, the company said.

Prices for the HS-10 start at $32,500, and prices for the HS-20 start at $39,000.

More information is available from Harris, Computer Systems Division, 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.



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SYSTEMS & PERIPHERALS

Continued from page 83

cludes input through manual key-entry terminals, the vendor said.

The price of the system is dependent on the hardware and software configuration needed by the customer, but it starts at approximately $100,000, the vendor said.

Optical Business Machines, 804 W. New Haven Ave., Melbourne, Fla. 32901.

TERMINALS

LIBERTY ELECTRONICS U.S.A.
Freedom terminal enhancements

Liberty Electronics U.S.A. has enhanced three of its terminals and cut the price of another terminal.

Liberty is now offering 14-in., 132-col. display options for its Ascii terminals Freedom 110 and Freedom 200 and for its Digital Equipment Corp. VT220-compatible Freedom 220 terminal, the vendor said.

Prices for the enhanced terminal options are $595 for the Freedom 110, $745 for the Freedom 200 and $845 for the Freedom 220.

The price for a Freedom 110 has been reduced from $595 to $545, the vendor said.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.

DIPIX, INC.
Aries II

Dipix, Inc. has announced the Aries II mapping workstation for use with Intergraph Corp.'s Intergraph Computer-Aided Mapping System, said to allow users to integrate information from raster images with Intergraph graphics files.

The Aries II mapping workstation operates in three modes: tape-to-tape transfer of a graphics file in Intergraph's Standard Interchange Format from the Intergraph system to a stand-alone Aries workstation; Aries peripheral workstation interfaced to the Intergraph host Digital Equipment Corp. VAX-11 as a peripheral with direct transfer between the vector and raster data bases; and as a stand-alone Aries workstation networked to the Intergraph host allowing direct transfer of data and a distributed processing environment.

Aries II ranges in price from $35,000 in workstation mode to $100,000 as a stand-alone unit.

Dipix, Rivers Center, 10220 Old Columbia Road, Columbia, Md. 21046.

GE from page 81

the factory to a mainframe that processes new orders and downloads them back to the Tandem system.

The GE warehouse previously operated up to 16 hours a day but has cut back to about 12 hours per day because of the Tandem.

To begin work, equipment operators log on to the system by entering an ID password via their radio terminals. The system assigns the operators tasks according to their vehicle types and what products need to be moved.

"When we receive materials from the factory, the Tandem system selects an empty location from among the thousands of racks and, after the operator completes the delivery, automatically updates the inventory and checks that part number against the list of orders," Painter pointed out. "As a result, materials are available for shipment throughout the workday rather than just once in the morning, as with our previous system."

When an operator receives instructions to retrieve stored materials and deliver them to a dock for loading, the system selects a storage location and vehicle path that helps ensure efficiency.

Inventory control

"We can now track the physical movement of every bit of material inside the warehouse," Painter said. "The system not only maintains up-to-the-minute inventory control, but once the material is loaded into the trailer, it prepares the bills of lading and packing lists.

"As a result, we have realized a substantial increase in operator productivity and are shipping inventory a full day sooner. Because the system signals us that orders are ready, we can send materials straight from the warehouse receiving dock to the shipping dock doors," Painter added.

Painter pointed out that installation of the new system has brought other benefits. The record-keeping ability of the system provides a base for productivity. When unscheduled shipping needs arise, the system can redirect the equipment operators without affecting the work load.

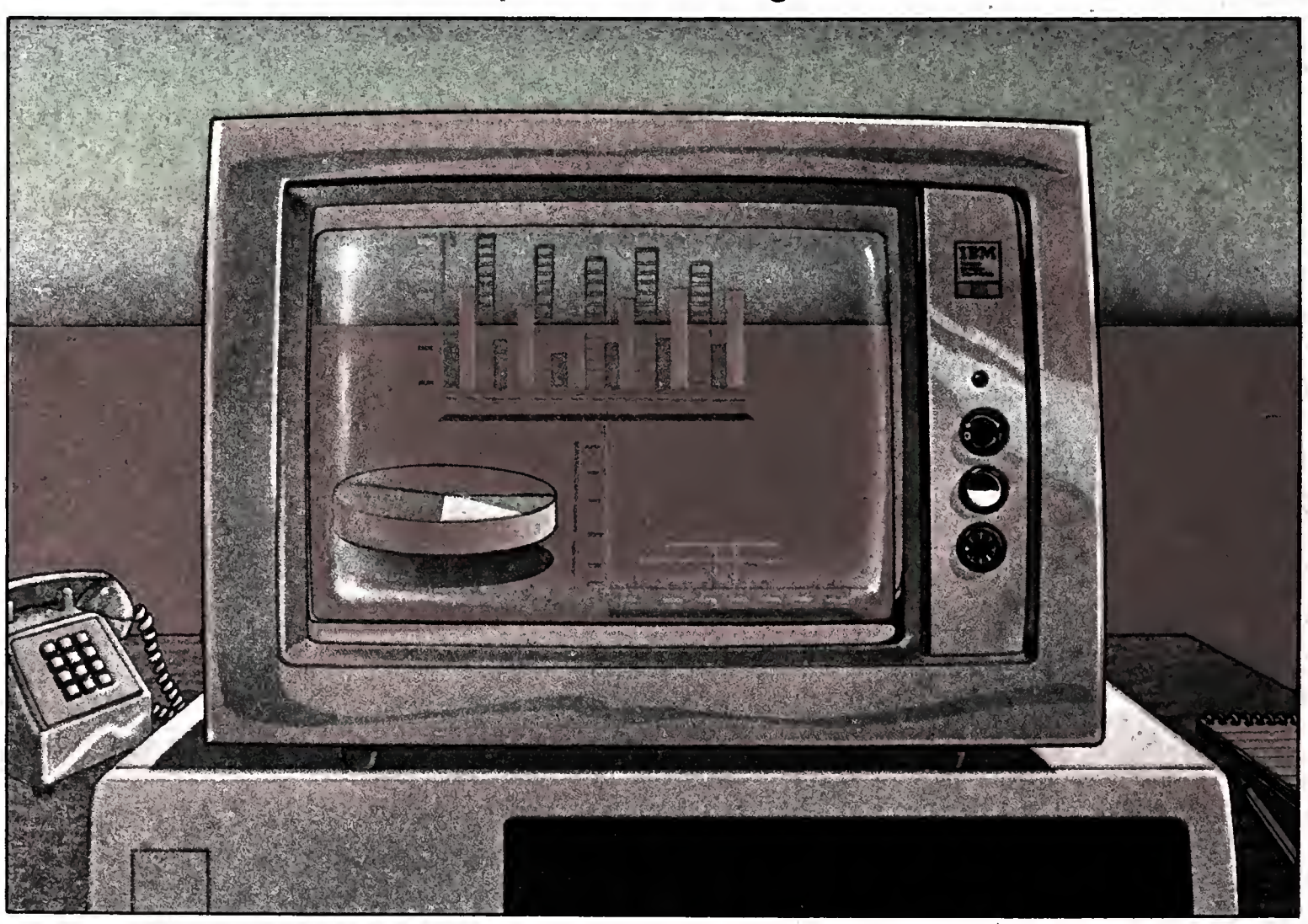
Also, the warehouse usually uses common and contract carriers to ship, and the computer system's ability to maintain weight and cubic footage details on all products affords a definite on-line load-planning tool.

Prior to automating operations, GE officials spent 18 months working with Eyring Research Co. to develop a customized software package. During that time, each member of the warehouse staff underwent training on the system.

Then, in October 1983, the system went on-line and began full operation immediately, replacing a Honeywell, Inc. HP 235 batch processing system.

"Some of our personnel had been batch processing orders for 15 years, so they were somewhat worried about going on-line," Painter said, "but after an initial adjustment period, things have run quite smoothly."

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Comdex/Fall shows all

Like a national political convention, Comdex/Fall '84 dominated the local landscape, generated tremendous hoopla with a working minimum of true excitement and ended up by promising something for everyone.

Some highlights:

■ This year's hottest desktop micros, the IBM Personal Computer AT and the Apple Computer, Inc. Macintosh, both received generous gifts of software and hardware add-ons from third-party suppliers.

■ Lotus Development Corp.'s Jazz integrated package for the Macintosh, in beta form, looked impressive during brief semipublic showings. One potential drawback is the $4,000-plus price tag for Jazz and the required 512K-byte Macintosh with external disk drive.

■ Lightyear, the decision-modeling package for the IBM Personal Computer introduced by Lightyear, Inc., also sparked a great deal of interest.

See **COMDEX** page 96

Traveling professionals to drive up portable use

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — By 1990, portable computers will play a more significant role in office automation functions as increased emphasis is placed on meeting the needs of the professional audience and automating the work of people who travel.

That was the assessment of Thomas Kinch, president of Micro Office Systems Technology, Inc., a Connecticut-based portable computer firm, who addressed a seminar on trends in the portable computer industry at Comdex/Fall '84, held here recently.

To date, the portable computer industry has focused on designing Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M-based systems. But Kinch said that with developments in 32-bit Cmos microprocessor technology, the industry is "not far away from introducing [an AT&T] Unix-based portable computer."

By the late 1980s, Kinch said, briefcase-size portable computers will be able to support a Unix file server.

Stymied by design shortcomings

Gene R. Talsky, president of Professional Marketing Management, Inc., a Connecticut-based consulting firm, said the market acceptance of these hand-held machines has been stymied by a number of design shortcomings.

The screen technology used in hand-held systems, which relies on the use of LCDs, presents problems for users, Talsky said.

"If you use a portable with an LCD display for more than an hour to run a word processing or spreadsheet program, it gets very tiring," he said. Problems with glare and contrast on LCDs remain to be addressed, he said.

Weaknesses to disappear

But, according to Talsky, the weaknesses of briefcase-size portables will disappear next year.

In 1985, he said, these hand-held computer systems will be designed with advanced microprocessors, will feature better displays — including flat panels — and will provide increased memory and storage.

Lisa Williams, president of STM Electronic Corp., a California-based computer firm that sells transportable computers, said that AT&T's entry into the computer market had introduced a new factor in the industry, one that could signal a change in direction for other computer firms.

Williams said AT&T has the ability to become another industry standard setter. "Cloning IBM is not the only strategy," she concluded.

■ Digital Equipment Corp. cut prices for its Rainbow microcomputer/**90**

■ NCR Corp. announced a local-area network/**91**

■ Alpha Software Corp. enhanced its four-function Electric Desk package/**92**

INSIDE

Software/**92**
Systems/**94**
Communications/**94**
Board-Level Devices/**96**

True Basic — from original Basic authors — gets graphics

HANOVER, N.H. — John G. Kemeny and Thomas E. Kurtz, creators of Basic in 1964, are gambling that graphics capabilities will lure current Basic users to True Basic, Inc.'s True Basic.

Last year, the authors of Basic formed True Basic, Inc. and announced plans to create a superior version of Basic. "We want to eliminate the babble of Basic," Kemeny stated.

The linchpin of their offering is its ability to support graphics. True Basic conforms to the proposed American National Standards Institute (Ansi) Basic and supports Ansi's Graphic Kernal System, a proposed graphics standard recently incorporated in a number of IBM graphics products [CW, Sept. 24].

Principal benefits that True Basic is said to provide include the ability to draw pictures without counting pixels and to recall pictures previously drawn, Kemeny said. Users reportedly can design graphs, charts, picture programs and animated displays that can be used in programs or stored in external libraries. Pictures can be changed, rotated and moved from one window to another.

The product, which combines an editor, compiler and interpreter, features English language syntax, sophisticated error-handling, on-line Help facilities, a full screen editor, windows, mouse support and programmed function keys, True Basic said.

Initially, the company is targeting educational institutes for the program. Kemeny claimed that True Basic, which requires 128K bytes of random-access memory, will be offered on a number of microcomputers, and programs written on one microcomputer can be easily moved to a second microcomputer.

The company has announced an IBM Personal Computer version with a shipping date of January 1985 and an Apple Computer, Inc. Macintosh version due in the second quarter of 1985.

True Basic costs $149.90. Addison-Wesley Publishing Co. will act as publisher, handling the two versions and related materials.

Addison-Wesley is located in Reading, Mass. 01807.

Spelling checker, text outliner introduced for Lotus Symphony

NEW YORK — For Lotus Development Corp., Nov. 12 was a day of product introductions, led by its debut of Jazz but also featuring the announcement of two software products for use with the firm's Symphony integrated package and a book.

The software products that bowed, a spelling checker and a text outliner, will each reportedly be priced at $139 and will be available in early 1985. The spelling checker, Lotus said, will allow users to compare words in a document against those in a master dictionary and will manually correct the word or choose from a list of alternative words. The text outliner, Lotus added, will allow users to switch from writing a text outline to editing the text itself. It reportedly will also create a table of contents automatically.

Also introduced was the "Lotus Guide to Learning Symphony," the first in what Lotus said will be a series of learning and application guides jointly produced by the Cambridge, Mass., software firm and the Addison-Wesley Publishing Co. The guide is priced at $22.95 and reportedly features 400 illustrations.

Lotus is located at 161 First St., Cambridge, Mass. 02142.

Corona unwraps desktop series said to be compatible with IBM

LAS VEGAS — Corona Data Systems, Inc. has announced an enhanced series of IBM-compatible desktop personal computers.

Corona's PC400 series features 640- by 400-pixel resolution, along with a 14-in. monitor. The systems reportedly provide users with the ability to run in IBM's medium and high 200-line-resolution mode or in Corona's 400-line mode, without an adapter card. Graphics adapters for the PC400 series are built into the motherboard, leaving an extra expansion slot free, Corona said.

Based on the Intel Corp. 8088 microprocessor, the PC400 series includes 256K bytes of random-access memory (expandable to 512K bytes); Microsoft Corp.'s MS-DOS and GW-Basic; Multimate International Corp.'s Multimate word processing package, and Comprehensive Software Support's PC-Tutor.

The series ranges from the Model 12, with one floppy disk drive, to the Model HD2, which includes one floppy disk drive and a 10M-byte hard disk drive. The Model 12 is priced at $2,650, and the Model HD2 costs $4,395.

Corona is headquartered at 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

Spreadsheets cited most used micro software

NEW YORK — Spreadsheets are the most widely used software packages among companies using microcomputers, a national survey has found. According to the National Association of Accountants (NAA), which sponsored the survey, more than 90% of the companies purchasing micros use spreadsheet software packages.

Most companies initially bought micros hoping to use them for budget and financial analysis applications, the survey said, but it noted that 64% of the respondents used word processing software; 37% had general accounting packages; and 36% used graphics packages.

The survey found that 47% of the respondents using spreadsheets used Lotus Development Corp.'s 1-2-3; 22% chose Software Arts, Inc.'s Visicalc; and 12% used Sorcim Corp.'s Supercalc.

Word processing packages

Of those companies that use word processing packages, Micropro International Corp.'s Wordstar is used by 33% of the respondents. Service industry firms use word processing packages most frequently, the survey said.

"Respondents ... were not as pleased with their word processing software selection as they were with their spreadsheet selection," according to the survey.

This may be because "most of the respondents held management accounting positions and ... do not have hands-on experience working with their word processing package."

Manual systems replaced

BPI Systems, Inc.'s General Accounting was the accounting package employed by most of the respondents, the survey said. General accounting software packages were purchased primarily to replace manual systems, according to the NAA survey. The financial sector (including banks, insurance companies, real estate firms and security brokerage firms) had the biggest users of graphics software packages, the survey said.

More than 80% reportedly used their graphics package for preparing illustrations in reports and documents, and 74% used it to prepare graphs and charts for company presentations.

IBM Personal Computers reportedly were the most used micros among those surveyed. Another system mentioned frequently was IBM's Personal Computer XT.

Majority have one micro

According to the survey, the majority of the participants had one micro and used it between 20 and 40 hours a week. Most said that both management staff and between one and three clerical personnel are trained to use a microcomputer.

Conducted in cooperation with Auerbach Publishers, Inc. of Pennsauken, N.J., the survey questioned about 500 manufacturing firms and financial service organizations employing more than 500 people and reporting annual revenue in excess of $100 million.

Answers were also received from service industry firms reporting annual revenues between $1 million and $9.9 million and with fewer than 100 employees.

Results of the survey are published in this month's edition of *Management Accounting*.

DEC reduces micro, memory, software prices

LITTLETON, Mass. — Digital Equipment Corp. has reduced prices on its Rainbow 100 and Rainbow 100+ personal computers, memory options and operating system software.

The system unit price of the floppy-disk-based Rainbow 100 with 128K bytes of main memory is now $2,415 — reduced from $2,750 — and the Rainbow 100+ with a 10M-byte hard disk is now $4,315 — reduced from $5,075, the firm said.

The price of the 128K-byte option has been reduced from $449 to $300, and the 256K-byte option has been cut from $895 to $695.

Prices for Digital Research Inc.'s CP/M 86/80 or Microsoft Corp.'s MS-DOS operating systems have been reduced from $275 to $95 each. The two systems can be purchased together for $175, the company said.

Keyboard and monitor prices remain unchanged, however. A typical configuration of the Rainbow 100 system with 256K bytes of memory, keyboard, monitor and choice of operating systems is now $3,380, compared with $4,044, while a similarly equipped Rainbow 100+ is about $5,289 — reduced from $6,369, the company said.

DEC is located at 146 Main St., Maynard, Mass. 01754.

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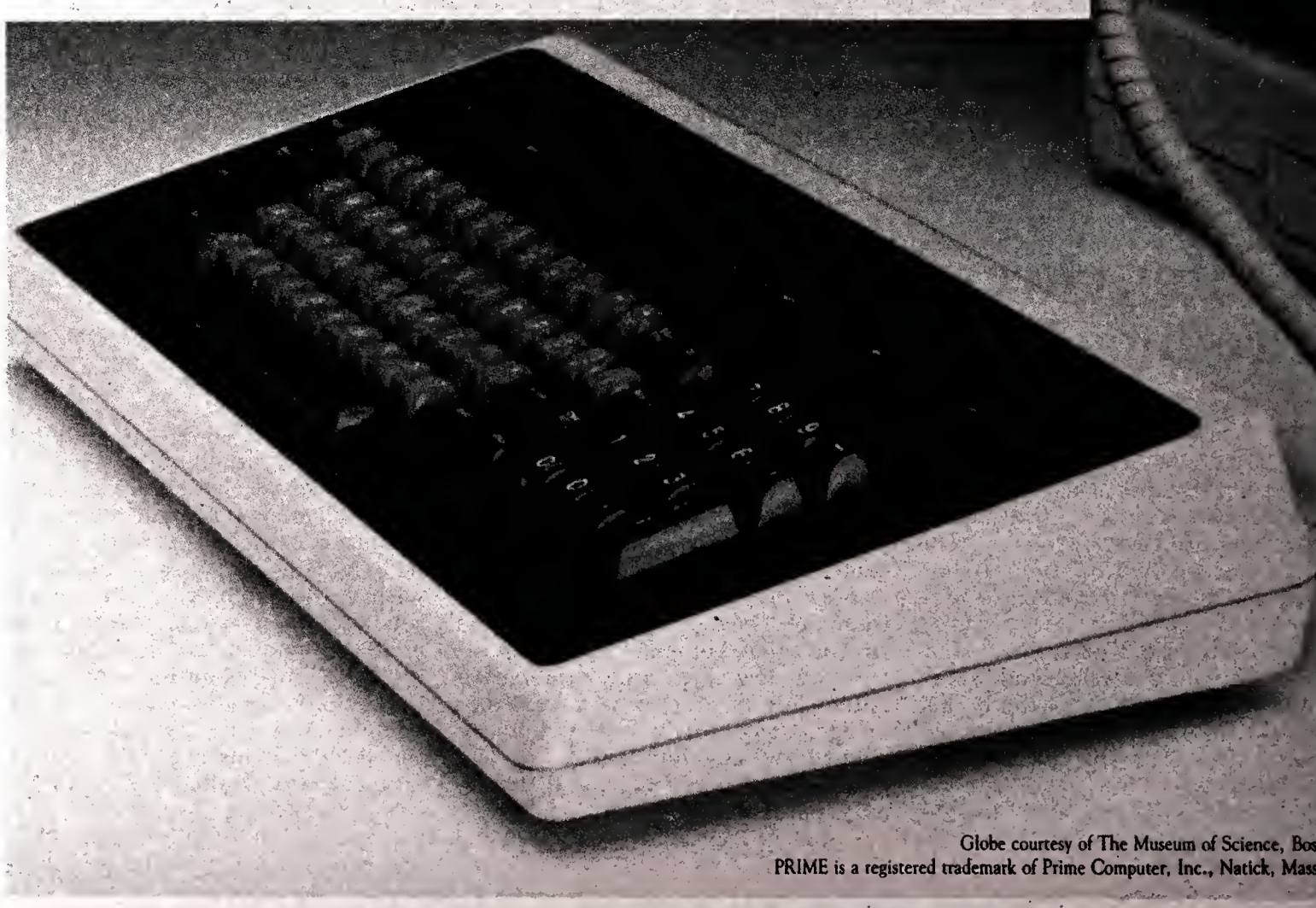
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Phone management available

Packages to autodial, autoanswer, provide security and remote access

PALO ALTO, Calif. — Digital Pathways, Inc., has introduced a line of communications software that is said to allow an IBM Personal Computer XT to perform telephone answering functions.

The Soundware series of products include: Communicard, a voice communications card, telephone management software called Voicemate and programming software called Soundtools.

Communicard permits high-quality voice to be recorded on a hard disk, the vendor said. The card is said to require a half slot in the IBM PC XT or compatible card cage and to provide automatic Touch-Tone recognition.

Used in conjunction with Communicard, Voicemate reportedly provides an individual telephone management system with message greeting, message playback, phone directory with automatic dialing capability, password recognition, remote owner access for message playback and audit train, voice file transmission, Touch-Tone dialing and Touch-Tone decoding.

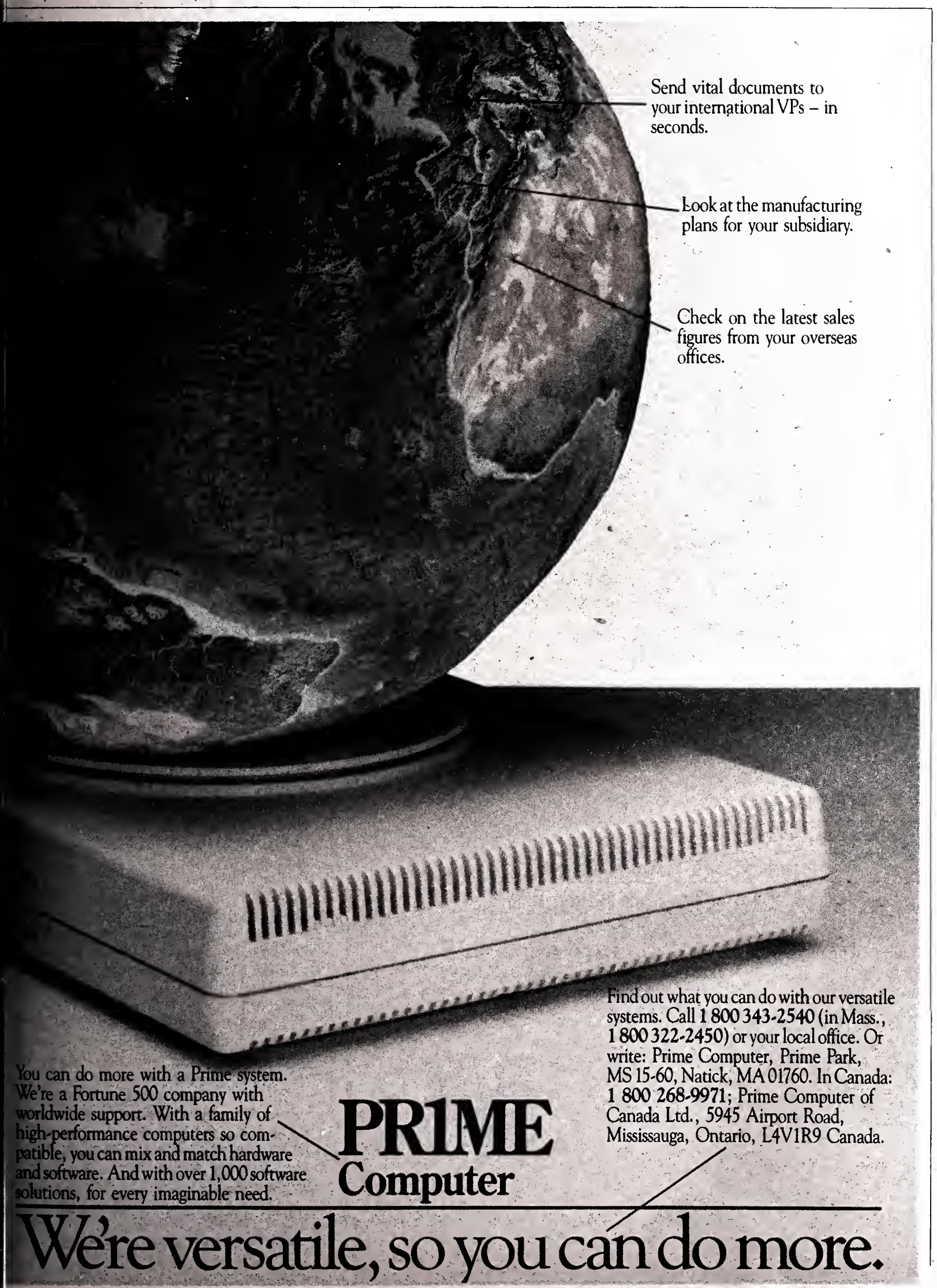
Voicemate includes a remote-access feature that allows the owner to call the personal computer and play back messages, the vendor said.

Soundtools reportedly allows users to develop their own software applications, including voice recording capabilities.

Price of the Soundware package, including Communicard, a diskette with Voicemate and Soundtools software, is $449.

The Communicard and Soundtools modules together sell for $329.

Digital Pathways is headquartered at 1060 E. Meadow Circle, Palo Alto, Calif. 94303.



Macintosh Think Tank announced

LAS VEGAS — Living Videotex introduced a version of its Think Tank outline processor for the 512K-byte model of the Apple Computer, Inc. Macintosh here this month at the Comdex/Fall '84 show.

Peter Winer, director of new product development for the Mountain View, Calif.-based software firm, said Think Tank for the large-memory Macintosh offers the capacity to store windows of text or graphics within a Think Tank outline, something not possible on earlier versions.

Think Tank lacks built-in graphics-generation capability, Winer said, but it allows graphics to be imported from any graphics program that runs on the Macintosh.

Like the other versions of Think Tank (for the Apple IIe, the 128K-byte Macintosh and the IBM Personal Computer) the new version of the software allows users to create an outline from notes and ideas entered in any order.

Winer pointed out that larger concepts are stored under main headlines and more specific concepts under smaller subheadlines, both created by the user.

A special feature of the 512K-byte Macintosh version, Winer noted, is its "slide show" function, under which users can place a series of graphics elements — including digitized pictures — back-to-back in a series and then run through them as if they were doing a slide show, with the machine's mouse acting as the remote control.

Think Tank for the 512K-byte Macintosh is priced at $245. An upgrade for users of Think Tank on the 128K-byte Macintosh is priced at $100.

Living Videotex is located at 2432 Charleston Road, Mountain View, Calif. 94043.

PC2PC links compatibles

DAYTON, Ohio — NCR Corp. has introduced PC2PC, a local-area network that links IBM Personal Computers and compatible computers.

The product transforms any micro on the network into a file server and allows up to 64 machines to be connected, NCR said. It is said to operate at a transmission speed of 1M bit/sec and to allow users to share printers, hard disks and communication lines.

"This product is user-installable and the entire network can be fully operational in less than two hours," Vernon W. Yates, NCR division vice-president and general manager, said. "It uses a small number of easy-to-use commands to allow the novice and experienced user to explore the capabilities of the network."

The cost of the network is $495 per connection.

NCR is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

MICROCOMPUTERS

SOFTWARE

APPLIED DATA RESEARCH, INC.
ADR/PC Adroit enhancements

Applied Data Research, Inc. has enhanced ADR/PC Adroit, its training system software that runs on the IBM Personal Computer with IBM's PC-DOS operating system.

The product now is able to capture mainframe screens and create corresponding Adroit text screens, according to the vendor. To complete this task, a user requires a Digital Communications Associates, Inc. Irma board that is activated by the control key, Applied Data Research said. The enhancement reportedly expedites tutorial creation when combined with Adroit's software simulation capability.

Adroit costs $4,500.

Applied Data Research, Rt. 206 & Orchard Road, CN-8, Princeton, N.J. 08540.

PRECISION SOFTWARE PRODUCTS
Keys Please!

Precision Software Products has developed a product said to increase the speed of Micropro International Corp.'s Wordstar word processing package by 20% to 40%.

According to the company, Keys Please! puts all Wordstar commands onto function keys, and all printer capabilities are automatically activated. The product comes with an on-screen reference line and a chart of commands, eliminating the need to memorize Wordstar letter codes, the company said.

An Instant Install process enables Wordstar users to change peripherals to their computer systems without having to go through a Wordstar installation process.

Keys Please! with Instant Install is available with several operating systems, including Microsoft Corp.'s MS-DOS, IBM's PC-DOS, Digital Research, Inc.'s CP/M 80 and CP/M 3.0 and Musys Corp.'s Turbodos.

The cost of the product is $69.95

Precision Software Products, Suite 204, 360 17th St., Oakland, Calif. 94612.

STRATEGIC SOFTWARE PLANNING CORP.
Promis for the Personal Computer AT

Strategic Software Planning Corp. has announced that its project management software system is now available for the IBM Personal Computer AT.

Project Management Integrated System (Promis) can reportedly handle project planning, tracking, resource management and cost control functions. The product utilizes a data base architecture and report writing and graphics capabilities.

The cost of Promis is $2,995.

Strategic Software Planning, 222 Third St., Cambridge, Mass. 02142.

MANAGEMENT CONTROL SYSTEMS, INC.
Quick-Look Version 84.01; Financial Reporting System Version 2.01

Calculations for computing income tax averaging, 10-year averaging and marriage penalty deductions are among the enhancements included in Version 84.01 of Management Control Systems' (MCS) Quick-Look tax planner package.

The software reportedly runs on IBM's System/34 and 36, Personal Computer XT and AT and System/23.

Quick-Look Version 84.01 costs $535 for the IBM System/34 and System/36 computers. The cost of the software on the Personal Computer XT and AT is $350, and for the System/23, it costs $495.

The company also announced the MCS Financial Reporting System Version 2.01 for the IBM Personal Computer XT and AT.

The product increases processing time by eliminating the need for loading a key diskette in the disk drive, according to the company. Keyboard handling has also been modified to speed up data entry, the company said.

The package requires 256K bytes of memory and a 10M-byte hard disk, according to the vendor. It costs $3,500.

Management Control Systems, 2400 Lake Park Drive, Symrna, Ga. 30080.

See **TOOLS** page 94



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Electric Desk gets upgrade

BURLINGTON, Mass. — Alpha Software Corp. has released an upgraded version of its Electric Desk, a four-function integrated package that runs on the IBM Personal Computer with IBM's PC-DOS operating system.

The new version reportedly supports spreadsheets up to 200K bytes in size, with improved speed in displaying spreadsheets. The upgrade also is said to add the ability to dial a phone number in the communications function without first creating a log-in script.

In addition, the enhanced Electric Desk can display foreign characters on-screen in the word processing mode, Alpha said.

Electric Desk runs with 256K bytes of random-access memory and provides word processing, data base management, spreadsheet and communications functions.

The upgrade will be provided free to current owners of the package. Electric Desk costs $345.

Alpha Software is located at 30 B St., Burlington, Mass. 01803.



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CW 1126



MICROCOMPUTERS

TOOLS from page 92

ANALYTICA CORP.
Reflex

Analytica Corp. has introduced Reflex, a data base management package for the IBM Personal Computer.

Reflex reportedly combines information management and analysis features and is designed for data collection and interpretation. It is said to perform traditional collection and retrieval functions. In addition, it facilitates analysis by allowing users to review information in a variety of formats and to group it to reveal interrelationships, trends and deviations, the company said.

Data reportedly can be organized in lists and tables, extracted and displayed in charts and graphs and summarized or combined using a number of built-in functions.

Reflex is said to require graphics capabilities and 384K bytes of random-access memory. It sells for $495.

Analytica, 3155 Kearney St., Freemont, Calif. 94538.

STERLING-CASTLE
The Decision Analyzer

Sterling-Castle has announced The Decision Analyzer, a decision-making software package for the IBM Personal Computer XT and compatibles.

The company said that up to five people can use the package, which reportedly makes judgments based on paired comparisons. The preferences of the decision maker on one or more criteria are combined into scores for each problem alternative or subject such as product preferences, plant sites, warehouse locations and personnel evaluations. Customers can then use the scores to determine the best course of action.

The package costs $199. Demonstration packages are being offered for $10.

Sterling-Castle, Suite 174, 702 Washington St., Marina del Ray, Calif. 90291.

LAYERED, INC.
Front Desk

Layered, Inc. has introduced a business calendar with a time accounting function for Apple Computer, Inc.'s Macintosh personal computer.

Front Desk integrates schedules in up to 15 categories, then reports or projects productivity and revenue per person or for an entire business, according to the vendor.

Front Desk can maintain employee schedules for up to 12 months and can provide time accounting information, the company said. Users can define standard hourly billing rates for each resource being scheduled. It reportedly uses the rates to calculate total revenue generated for each source.

Front Desk is priced at $149.95

Layered, 85 Merrimac St., Boston, Mass. 02114.

DURANGO SYSTEMS, INC.
RM/Cobol for Xenix 3.0

Durango Systems, Inc. has announced that Ryan-McFarland Corp.'s RM/Cobol compiler now runs on Durango's Poppy microcomputer series using Microsoft Corp.'s Xenix 3.0 operating system.

The company claimed that more than 1,500 application programs are available for RM/Cobol. RM/Cobol is now available on all Durango systems, which feature Intel Corp. 80186 and 80286 microprocessors and run Microsoft's MS-DOS and Digital Research, Inc.'s Concurrent CP/M 86 operating systems. The RM/Cobol compiler with runtime costs $1,250.

Durango Systems, 3003 N. First St., San Jose, Calif. 95134.



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SYSTEMS

COMPUTER CONSOLES, INC.
CCI Personal Computer

Computer Consoles, Inc. (CCI) has introduced a desktop personal computer that is compatible with the IBM Personal Computer.

The CCI Personal Computer comes with Microsoft Corp.'s MS-DOS 2.11, Basic programming language and CCI's Officepower office automation terminal emulation package.

Hardware consists of a table-top terminal, tilt-swivel monochrome or color monitor, an Intel Corp. 8088 microprocessor, 256K bytes of of random-access memory (RAM) expandable to 640K bytes, two serial ports and a parallel port.

The desktop computer can operate as a fully supported Officepower terminal and can perform all of the OA system's functions, including integrated record and word processing capabilities, the company said.

Base price of the product is $2,500 for a single floppy disk drive, monochrome display, 256K bytes of RAM and Powerterminal emulation software. Prices range up to $5,800, depending on configuration.

Computer Consoles, 97 Humboldt St., Rochester, N.Y., 14609.

COMMUNICATIONS

AVATAR TECHNOLOGIES, INC.
PA-Plus

Avatar Technologies, Inc. has introduced a package for the IBM Personal Computer and Personal Computer XT that provides IBM 3270 terminal emulation capabilities.

PA-Plus is said to offer IBM 3278-2 terminal emulation for users requiring dial-in access to IBM mainframes.

The software is designed to be used in conjunction with the vendor's

Continued on page 96

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MICROCOMPUTERS

Continued from page 94

PA1000 or PA1000E protocol converters. These stand-alone units are said to allow dial-in access to both the 3270 network and a local or remote asynchronous host computer. PA-Plus provides keyboard and data management features included in the PA100 board-level emulation product, the vendor said. The product reportedly lets IBM Personal Computer users run 3270 asynchronous communications and IBM PC-DOS application sessions concurrently.

When used with PA1000 or PA1000E, PA-Plus is said to provide programmable keyboards with Help screen support, screen capture to disk or memory, multilevel password security and automatic logon.

PA-Plus costs $100.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

DATAPOINT CORP.
Intelligent Network Executive; PC8220

Datapoint Corp. has announced an adaptor card for the IBM Personal Computer AT that is said to enable the AT to function as an applications processor on a Datapoint Attached Resource Computer (ARC) local-area network.

The company also announced the PC8220, a software package that reportedly provides emulation of a Datapoint 8220 terminal.

The adaptor card, called the Intelligent Network Executive, is designed to fit in an expansion slot of the Personal Computer AT and is said to enable users to link their microcomputers via the Datapoint ARC intelligent network. The card is priced at $695.

The PC8220 emulation package reportedly enables an IBM Personal Computer to emulate a Datapoint terminal. Software support includes Datapoint's Resource Management System operating system. The product is priced at $175.

Datapoint, 9725 Datapoint Drive, San Antonio, Texas 78284.

PRINTERS/PLOTTERS/ PERIPHERALS

TOSHIBA AMERICA, INC.
P1351 printer enhancements

Toshiba America, Inc.'s Information Systems Division has introduced an automatic sheet feeder and bidirectional tractor feed for its P1351 dot matrix printer.

The sheet feeder is capable of handling letter- and legal-size paper and can accommodate up to 170 sheets, including letterhead, the company said.

Using the bidirectional tractor, the printer reportedly can handle superscript and subscript for scientific notion with one and multipart forms.

The printer can accommodate bidirectional printing with both scripts without speed degradation, Toshiba said.

The sheet feeder retails for $995; the tractor feed is priced at $195, the vendor said.

Toshiba America, Information Systems Division, 2441 Michelle Drive, Tustin, Calif. 92680.

BOARD-LEVEL DEVICES

STRUCTURED SOFTWARE SYSTEMS, INC.
Mass-Storage ROM for HP 9825T

Structured Software Systems, Inc. has offered Mass-Storage Read-Only Memory (ROM) for the Hewlett-Packard Co. HP 9825T desktop computer.

The product reportedly replaces the HP 9822A Flexible Disk Drive ROM and 9895 8-in. double-sided drive. It is said to plug into one of the HP micro's four expansion slots in the same manner as the HP option ROMs.

The Mass-Storage ROM also interfaces to all Hewlett-Packard disks, including the 9221 and 9122 3½-in. microdiskette drives, according to the vendor.

The Mass-Storage ROM is priced at $600.

Structured Software Systems, Box 1072, Irick Road, Mount Holly, N.J. 08060.

COMDEX from page 89

■ Simple "pop-up" packages such as Borland International's Sidekick, offering handy and easily accessible features within other applications, were the programs that came up most frequently in casual conversation. "At last I really have a reason to use [a personal computer] every day!" one user remarked.

■ With IBM compatibility a standard for most serious personal computer manufacturers, vendors increasingly are attempting to differentiate themselves once again by adding communications or graphics features or by using value-added reselling strategies. In one example, ITT launched a personal computer, called the Voice Communications PC, which was aimed at integrating voice recognition, management and synthesis features into the company's Xtra.

■ Dozens of local-area network-related announcements were scattered throughout Comdex. Speaking almost as one, network suppliers insisted that IBM's PC Network and Microsoft, Inc.'s Networks/MS-DOS 3.1 have broken the ice on software application standardization. Copy protection and licensing for network-delivered software remain major stumbling blocks, however.

Quite likely, Comdex unleashed a thousand products on a grateful world, and every last one of them was described a thousand times in exactly the same way — as a customer solution.



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COMPUTER INDUSTRY

STC credit plan canceled; 1,200 layoffs announced

By David Olmos
CW Staff

LOUISVILLE, Colo. — Storage Technology Corp.'s (STC) efforts to steady its tottering business were dealt a serious blow when Chemical Bank of New York recently decided to terminate a previously announced loan commitment.

The cash infusion was badly needed by STC, which last month filed for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act.

STC, a maker of data storage devices, said Nov. 16 that Chemical Bank had terminated the loan agreement in which it would have provided STC with a $150 million credit line. The loan had been subject to a definitive agreement between the companies and approval from the bankruptcy court.

In the wake of that development, STC said last week that it was further reducing its work force by 1,200, with 1,100 of those positions being taken from its Colorado facilities and 100 at its Documation subsidiary in Palm Bay, Fla.

STC's board of directors also named one of its members, Thomas F. Wands, as interim president and chief executive officer (CEO). Jesse Aweida stepped down as CEO but remained as chairman of the board.

'[STC] can obtain sufficient short-term financing to operate its business until longer term financing issues are resolved.'
— STC statement

STC said it was negotiating with other financial institutions to obtain the cash it needs to operate while it reorganizes under Chapter 11. "The company believes that it can obtain sufficient short-term financing to operate its business until its longer term financing issues are resolved," STC said in a statement.

STC gave no explanation for why the loan was terminated. Ken Herz, a spokesman for Chemical Bank, said the company would not comment on the matter. Erica Rosenfeld, a spokeswoman for Touche

See **STC** page 109

Peachtree sale, demise refuted; retail sale eyed

Manager cites rebound, predicts profitable '85

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — When Larry Smart, general manager of Peachtree Software, Inc., took the podium at a Comdex/Fall '84 press conference here recently, he did not waste any time getting to the heart of the matter.

"It has been widely rumored that the purpose of this press conference was to announce the sale or shutdown of Peachtree Software," he said. [Management Science America, Inc. (MSA) had recently announced that Peachtree, its microcomputer software subsidiary, was up for sale.] "But the discussion of our death has been widely exaggerated," said Smart, who also serves as senior vice-president of MSA.

MSA, in conjunction with Alex Brown, a Baltimore-based investment banking firm, recently issued an "offering memoran-

See **MSA** page 109

■ The proposed merger with Visicorp solves funding problems for Paladin Software Corp. but also saddles it with restoring credibility to a tarnished product line, the president of Paladin acknowledged recently/**105**

■ Speaking of mergers, the recently announced absorption of Visual Technology, Inc. by Lee Data Corp. had been under discussion for two years, executives of both companies said recently/**106**

■ Financially ailing Eagle Computer, Inc. posted a loss for the most recent quarter but managed to sound cheerful anyway/**108**

IBM seeks mart leverage via customer revenue

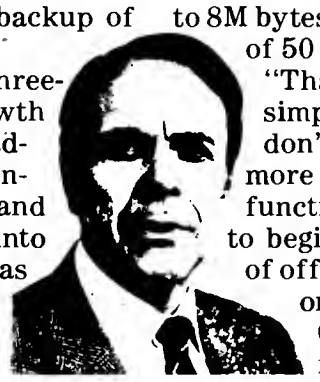
By John Desmond
CW Staff

NEW YORK — Despite dramatic drops in hardware prices in the last 20 years, IBM's marketing strategy is to continue to increase its revenues from existing customers by selling them increasingly more powerful CPUs with more demanding software.

So said noted IBM consultant and author Fred Lamond, who spoke at a recent seminar here.

Lamond said the cost of main memory has dropped 600:1 in the last 20 years, based on the price for 1M byte of main memory on an IBM 2365 Model 2 in 1964 and on the same capacity for an IBM Personal Computer AT today.

To maintain revenues, IBM has had to sell its oldest customers on using 600 times the processing power, 200 times the main memory and 50 times the disk backup of 20 years ago, he said.


Lamond

Lamond, who conducted a three-day seminar on alternative growth strategies for IBM users, addressed the issue of how the increased power is being used and whether users are really locked into the directions that IBM has mapped out for them.

As IBM main memory has increased, operating systems have occupied greater capacities of main memory, Lamond noted. For example, the IBM OS/360 MFT operating system running on the IBM 360/75 occupied 80K bytes in main memory. The MVS/XA operating system running on the 3081 Model KX mainframe requires 4M to 8M bytes of main memory — an increase of 50 to 100 times, he said.

"That growth has not been done by simply adding lots of loops that don't do any work. IBM has added more functions," Lamond said. The functions added have allowed users to begin programming on-line instead of off-line and to execute instructions on-line instead of in batch mode.

Competition in the 1970s from minicomputer vendors such as Digital Equipment Corp. helped motivate IBM to aid program development, Lamond said. A 1975 survey that IBM commissioned showed that appli-

See **IBM** page 108

ACRS cuts, changes seen key to tax simplification

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

Generally believed to be supportive of President Ronald Reagan in the recent election, computer users and vendors may find the November ballot shockingly counterproductive to their own interests if recent reports out of Washington, D.C., are accurate.

In the traditional Washingtonian style of anonymous spokesmen and sources floating trial balloons to see how well they fly, recent press reports indicated that a key measure to any tax simplification proposal from the U.S. Department of the Treasury will be the modification or elimination of the Accelerated Cost Recovery System (ACRS).

ACRS is the bonanza tax write-down program instituted just a few years ago to substitute for the actual life depreciation method of writing off expenditures on tangible equipment and property.

Aside from election campaign rhetoric, just about anybody with a head on his shoulders must by now realize that the U.S. government needs some mechanism to relieve the astounding federal budget deficits being run up by the administration that came to town with the stated goal of shrinking the federal government.

With Reagan committed to defense spending, senators and representatives unwilling to touch popular entitlement programs and the growing federal debt taking an increasing bite just for interest payments, the moderate viewpoint is that some type of enhancements to the federal government's revenue collection are mandatory.

Because cutting ACRS is the first substantive trial balloon to be floated, it seems reasonable to conclude that flat-tax simplification is going to involve an attempt to remove what is probably the most admired, and arguably the most effective, business stimulation program in recent history.

It will affect computer industry vendors who need large amounts of capital in order to make rapid and expensive development plans to stay abreast of America's fastest moving industry. It will impact users who are now encouraged to replace older generation equipment because they can effectively recover the costs of purchase in five years. And it will impact the leasing indus-

See **ACRS** page 107

Lack of changes in 1984 tax act leaves credit status

OUTSIDE LINES
Alonzo D Saunders

Perhaps the biggest nonevent of the Tax Reform Act of 1984 was that no changes were made to the rules regarding software development credits. The Internal Revenue Service code says that the costs of developing computer software do not automatically qualify as a research and experimentation credit. What qualifies is "new or significantly improved" software.

Consider the quandry of Lotus Development Corp. Its Symphony product, as currently envisioned under the law, is eligible for the credit. But what about a product like [Lotus] 1-2-3? Does "significantly improved" hinder taking the credit if 1-2-3 were to become [Lotus] 1-2-3-4? A software product line extension or a product that is compatible with another is likewise on uncertain ground.

Taking the credit has a direct impact on the balance sheet, because a credit is a deduction from taxes. As Robert Langer, treasurer of Lotus, put the problem, if the credit reduces the company's tax rate from 50% to 48%, then the company's earnings are correspondingly increased. So are earnings per share and the interests of financiers and capital markets in the company.

The downside is that if an IRS audit disallows the credit, the company may find itself restating earnings. Shareholders tend not to be pleased by a downward restatement. The Securities and Exchange Commission (SEC) position on this is well taken. Investors do not know at any given moment how hard a software development company's financials are unless the company voluntarily discloses whether its accounting treatment of the credit is aggressive or conservative. Ironically, there is not a specific accounting rule applicable under these circumstances to outline management discretion or circumscribe management greed.

The Department of the Treasury has offered some guidelines. Treasury distinguishes between software developed for in-house or "management" use and in-house, "innovative" software. The former would not qualify for the credit; the latter would. Treasury also disallows credit for "customized" software but not for software sold to the public without customization. These distinctions do not seem to have been made with marketing realities in mind, so they do not clarify matters. George Yost of Coopers & Lybrand has characterized

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Saunders is a Boston-based attorney with a practice that includes international marketing, antitrust issues and corporate finance.

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of software development in state of confusion

Treasury's policy in January 1984's *The Tax Executive* as a "disincentive" to software development.

The Financial Accounting Standards Board (FASB) — the major rule-making body for accountants — has recently proposed a rule that would allow certain software development costs to be treated as assets. The SEC opposes this approach on the grounds that it creates instant profits and, as discussed above, does not address uniformity in software accounting. Nevertheless, the SEC will defer to FASB, and if the FASB rule is adopted, it would become effective in December.

Congress deliberated this law for over a year, coming up with an act in two parts: the Spending Reduction Act, designed to decrease federal spending by some $13 billion; and the Tax Reform Act, designed to raise some $50 billion.

Unlike previous revenue-raising acts, this tax act was not intended to change income tax rates either for companies or for individuals. Its objective was to increase revenue by closing loopholes. The act, therefore, made significant technical changes, changes that are more subtle and less likely to have their impact felt immediately. The act also promised additional regulations in many areas, so there are auditors, lawyers, treasurers and others who are waiting for additional shoes to drop.

As we have seen, however, Congress may have been myopic by not putting these loopholes in perspective and balancing them against other, nontax policies. The result — a continuing lack of a coherent federal tax policy for the high-tech industry.

If it is said that Congress is the culprit, then it must also be said in all fairness that Congress may have done its duty as it saw fit, if not very well. Yet in the final analysis, not Congress but the industry itself must take responsibility for laws that nurtured its fragile beginnings, compensated its people, protected it (and its customers) from theft, kept its finances honest and provided incentives to be competitive worldwide.

If change or prevention of laws, which some call penalties and others call disincentives, are to be made, then the high-tech industry should read the Tax Reform Act of 1984 as a call to arms: The industry must dramatically step up its relations with the public and its liaisons with Congress. It should devise a strategy to lobby at the federal level as never before.

First, the industry should attack the serious problem posed by the lack of clarity of the software development accounting rules. Second, the industry should develop a position that will counteract the inevitable and possibly onerous coming of future IRS regulations. Allies such as FASB, the Big Eight, legal counsel and public relations counsel should be involved.

In short, the Tax Act's errors and omissions demonstrated Congress' ignorance of the realities of the high-tech industry and, sadly, also demonstrated the industry's lack of clout in the corridors of Congress. Now that the industry has seen what can occur without political diligence, perhaps it will be motivated to get organized and step up the fight for its objectives.

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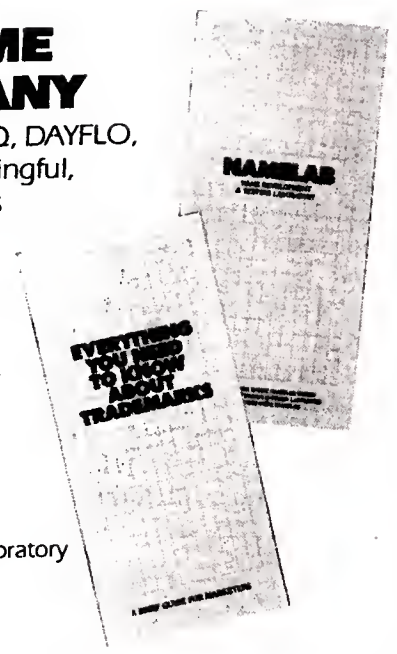
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COMPUTER INDUSTRY

IBM users question future

Integration, ambiguous solutions raise concern

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — Concerned IBM users, trying to plot their future strategies, are questioning the company about a number of wide-ranging issues, encompassing everything from ambiguous IBM solutions to a perceived lack of integration among IBM product families.

So claimed Robert T. Fertig, president of Enterprise Information Systems, Inc. at a seminar held at the sixth annual Enterprise Information Systems forum in San Diego recently. Using results from his annual survey of more than 200 IBM users, Fertig said other user concerns centered on IBM's nebulous operating system strategy, plans for the VM/CMS environment, questions about the direction of distributed data processing and dismay over IBM's rapidly skyrocketing support costs.

Based on the survey, Fertig predicted several IBM product and strategy scenarios through 1987.

■ Unlike Digital Equipment Corp., IBM will avoid providing a total integrated office automation solution. DEC's OA solution lets users move from a Microvax I and II to clustered DEC 8600s using a single operating system. This strategy makes DEC's products an obvious target for plug-compatibles, and any price/performance improvements to low-end products must also be implemented at the high end.

■ IBM's popular Professional Office Systems Software (Profs) will merge with the poorly performing Distributed Office System Support (Disoss) host-based business system by the second quarter.

■ IBM will develop multiple solutions and overlapping products to answer mainframe server needs. The 8100 will be enhanced to act as a file and print server in a local-area network. The 8100, 4300, System/36 and System/38 will all serve distributed processing needs. This strategy will prove expensive and confusing for users but will let IBM offer a moving target to competitors.

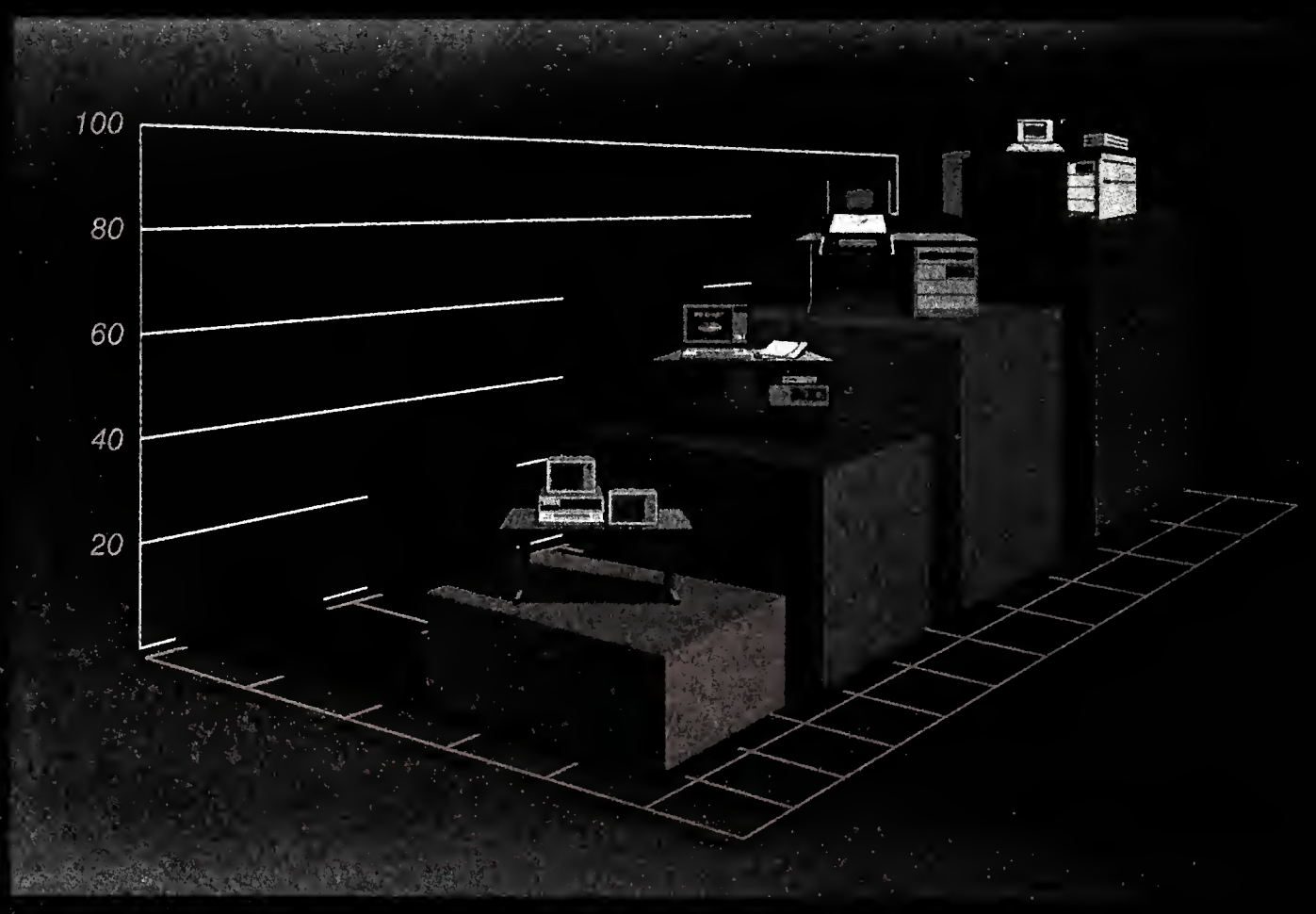
■ IBM will announce initial models of its next mainframe family, the Sierra series, with capacities of 7.5 to 30 millions of instructions per second perhaps as early as third-quarter 1985. Offering bulk main storage, the Sierra will adversely impact IBM's existing 3080Q and KX series, offering twice as much performance for the price. The Summit series, a sucessor to the Sierra, may be announced by the second quarter of 1987.

■ IBM's mid-range System/38 will merge with the 4300 line by 1986 and serve as a key departmental and host system in IBM's OA strategy.

■ An 80386-based update to the Personal Computer AT will be released in 1986. The AT will continue to run both MS-DOS and Xenix, underscoring IBM's strategy of offering several solutions and letting the market decide.

■ Aimed squarely at the business/professional market, IBM will announce the Crackerjack portable computer, Fertig said, by this Christmas. The 80186-based, stripped-down model will run MS-DOS, retail for $1,500, weigh less than 15 lb, have a built-in 3½-in. disk drive and an attached plasma display.

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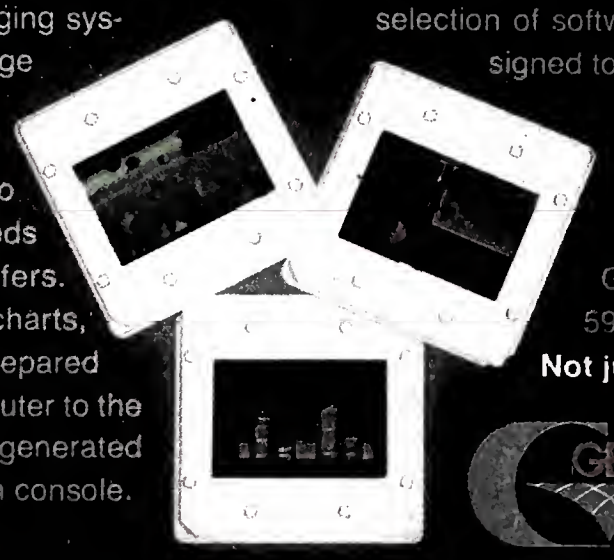
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Even with all its power, the VAX 8600 system conserves floor space. The CPU fits into the same size cabinet as the VAX-11/780 CPU. Power consumption and air conditioning requirements are similar, too.

VAX 8600 SYSTEM HIGHLIGHTS

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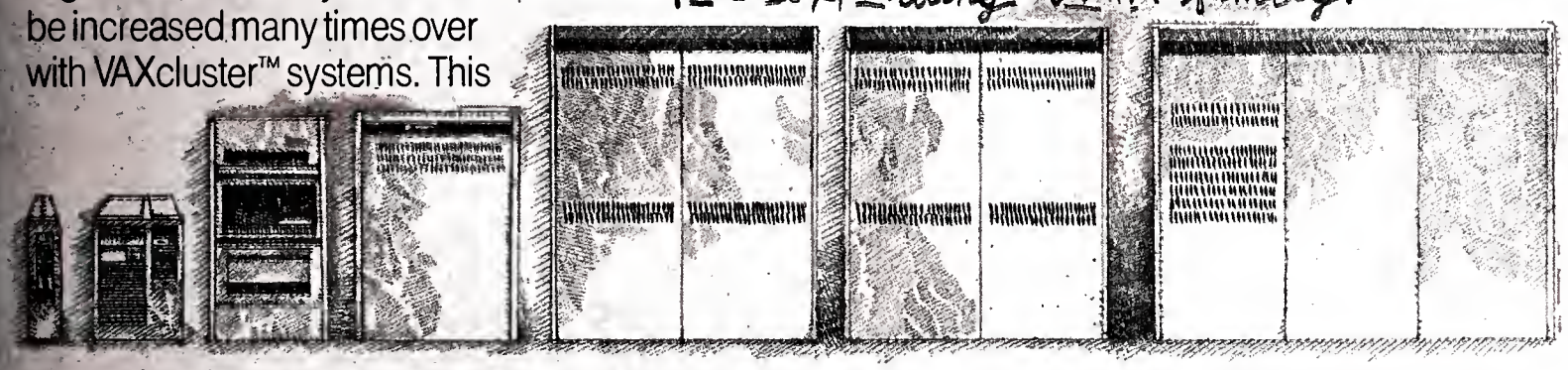
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Rolm acquisition girds IBM for telecom, PBX mart push

CW AT ENTERPRISE INFO SYSTEMS

By Kathleen Burton
CW West Coast Bureau

SAN DIEGO — IBM's acquisition of Rolm Corp. will yield several new private branch exchange (PBX) voice and data products and represents the importance the company places on providing telecommunications products and services, an IBM marketing executive said recently.

At the Enterprise Information Systems Forum here, Kenneth B. Simon, IBM manager of product marketing, stressed the importance of IBM's recent acquisition of Rolm — the Santa Clara, Calif.-based telecommunications firm — and its 60% ownership of Satellite Business Systems, a satellite communications firm.

IBM plans to emphasize its thrust into the telecommunications arena in several ways, said Simon, by sponsoring business shows to announce and display new telecommunications products (IBM sponsored six such shows in 1984), by emphasizing issues and product-oriented advertising and by developing specialized telecommunications product marketing groups.

Expand telecom experts

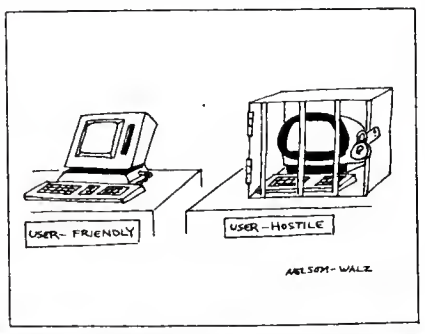
IBM will also expand its cadre of telecommunications specialists from current bases in nine U.S. cities, and they will work closely with IBM account teams, he said. To support its customers directly, IBM also will develop executive briefings, hold seminars and offer network modeling to measure and predict a customer's future networking needs with a 99% accuracy rate, Simon said.

IBM's Fortune 1,000 accounts, according to Simon, are now demanding telecommunications products in several areas where IBM is not yet strong. Customer requests include voice terminals, digital workstations, remote high-speed digital links, digital multiplexers and networking capability to non-IBM hosts, he said.

Future products will focus on extending network connectivity, providing network management capability, expanding services and optimizing existing network configurations with enhancements to IBM's 3710 network controller and 7426 terminal interface, both introduced last year.

"Within the next year and a half, IBM will develop products that will connect a customer's manufacturing plant directly to his office," Simon said. The products will be extensions of IBM's token-bus protocols and broadband local-area network products, Simon said.

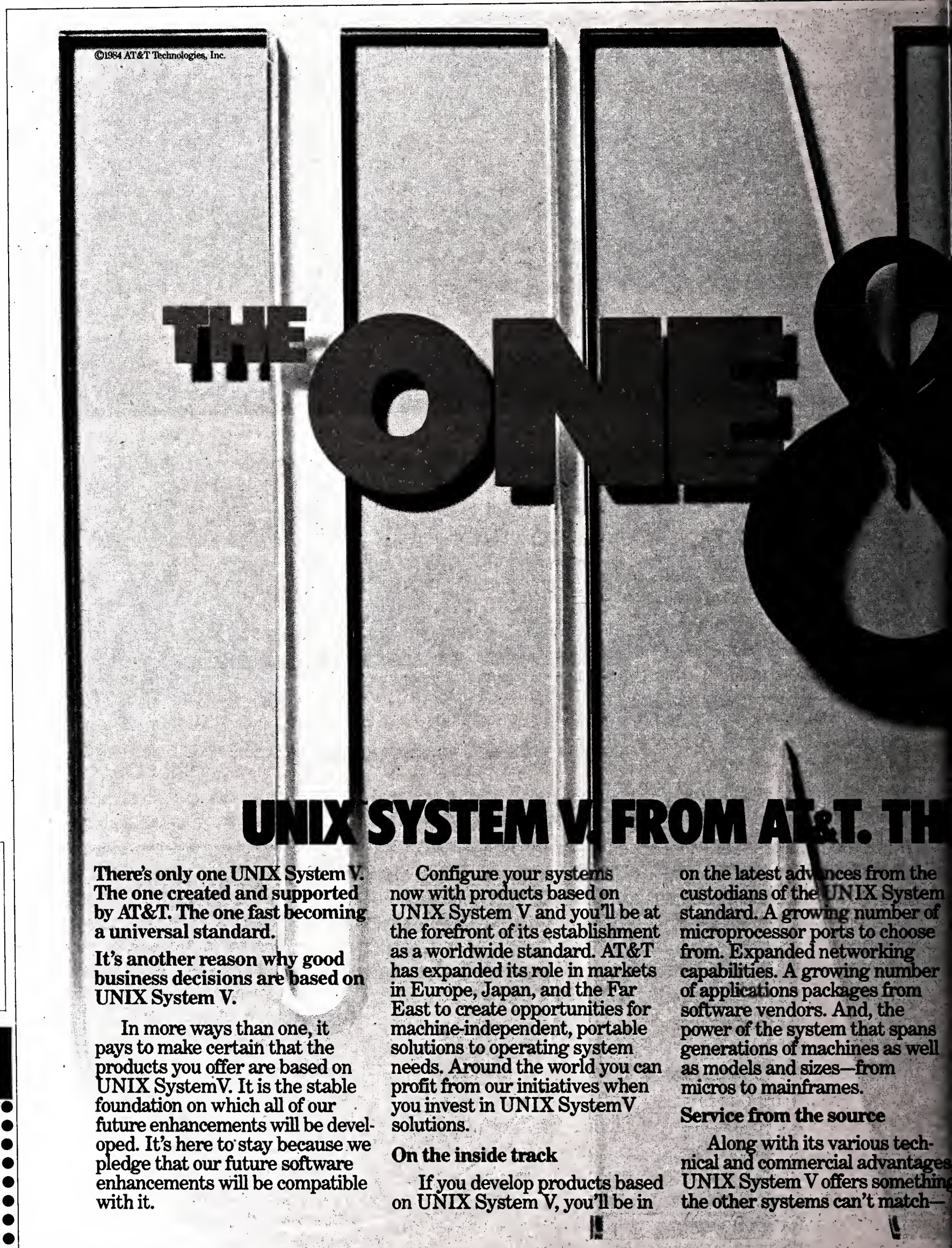
Customers will be able to customize the design by specifying whether they want independent local-area nets, networked IBM Personal Computers or structured intraoffice wiring. "IBM will also make an increasing thrust into the message marketplace," Simon said. IBM recently introduced its first messaging products: an audio distribution system, a telephone message management system and a voice/text messaging system, Simon said.



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COMPUTER INDUSTRY

Paladin out to restore credibility to Visicorp name

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — Paladin Software Corp. was a fledgling start-up in search of a second round of venture capital financing when it decided to merge with troubled, but cash rich, Visicorp.

The proposed merger of the two firms will solve Paladin's need for funds to continue working on its own product line, said Roy Folk, founder and president of Santa Clara, Calif.- based Paladin.

On the other hand, he acknowledged, the firm now shoulders a formidable task: restoring credibility to the Visicorp name and reclaiming confidence in its product line.

In an interview at the recent Comdex/Fall '84 held here, Folk, who worked at Visicorp for 2½ years before starting at Paladin, said he was confident the new firm "will be able to resurrect the good memories" that Visicorp was once able to evoke.

The new company, which will be known as Paladin Software Corp., will be headquartered in San Jose, Calif.

Visicorp, which gained early prominence in the personal computer industry as the distributor of Visicalc, has been beset with problems during the past year and a half.

When it was unable to provide enhancements to Visicalc, the firm lost market share and revenues to new competitors such as Lotus Development Corp. After an extended legal battle with Visicalc's creators, Software Arts, Inc., Visicorp lost the right to market its flagship product.

Problems with Visi On

In addition, Visicorp faced product delays and technical problems when it tried to design its next generation of software, an operating environment known as Visi On, Folk said.

But Folk said Paladin is prepared to restore the health and viability of Visicorp's product line, which includes Visi Series programs such as Visi Word and Visi Schedule, Flash Calc, PC Paint and Visi On.

As evidence of Paladin's commitment, Folk pointed to several product introductions made recently at Comdex. Included among them was a new version of Visi On, designed for the IBM Personal Computer AT. The new version, which takes advantage of the AT's 286 microprocessor, runs 3½ times faster than the original Visi On, Folk said.

More applications

When the original Visi On was unveiled, only one applications program was available, Folk noted. But now, all the applications programs for Visi On are ready, including spreadsheet, word processing, business graphics and presentation graphics programs, Folk said.

Paladin has also answered critics that said Visi On was overpriced. At $495, Visi On is aggressively priced to go up against industry leaders such as Lotus' 1-2-3 and Symphony and Ashton-Tate's Framework, Folk claimed.

"If we have the quality product that I believe we have, we now face the grueling task of turning dealers around," he said.

Folk declined to describe the products that Paladin has been working on. "We want to maintain a low profile until we are prepared to announce and ship the product," he said.

He said the products, which are being developed for the business market, will be introduced next year.



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Long talks led to Visual Technology buy-out

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — The proposed acquisition by Lee Data Corp., the Flying Cloud, Minn.-based vendor of IBM-compatible terminals and workstations, of Visual Technology, Inc., a Tewksbury, Mass., firm [CW, Nov. 19], had been under discussion for about two years, according to the presidents of both companies.

In a deal worth about $17 million, Visual Technology would become a wholly owned subsidiary of Lee Data, according to a preliminary merger agreement. Visual Technology would retain its current management, and its president, Tom Foley, would join Lee Data's board of directors.

Visual Technology, which sells Digital Equipment Corp.-compatible terminals, a Televideo Systems, Inc. emulator terminal and a 16-lb IBM-compatible portable, last week introduced the Visual 2000, a Microsoft Corp. Xenix-based multiuser system.

In an interview at the recent Comdex/Fall '84 here, John M. Lee, president of Lee Data, and Visual Technology's Foley said the proposed merger would serve to round out each other's product lines and strengthen each company's competitive position.

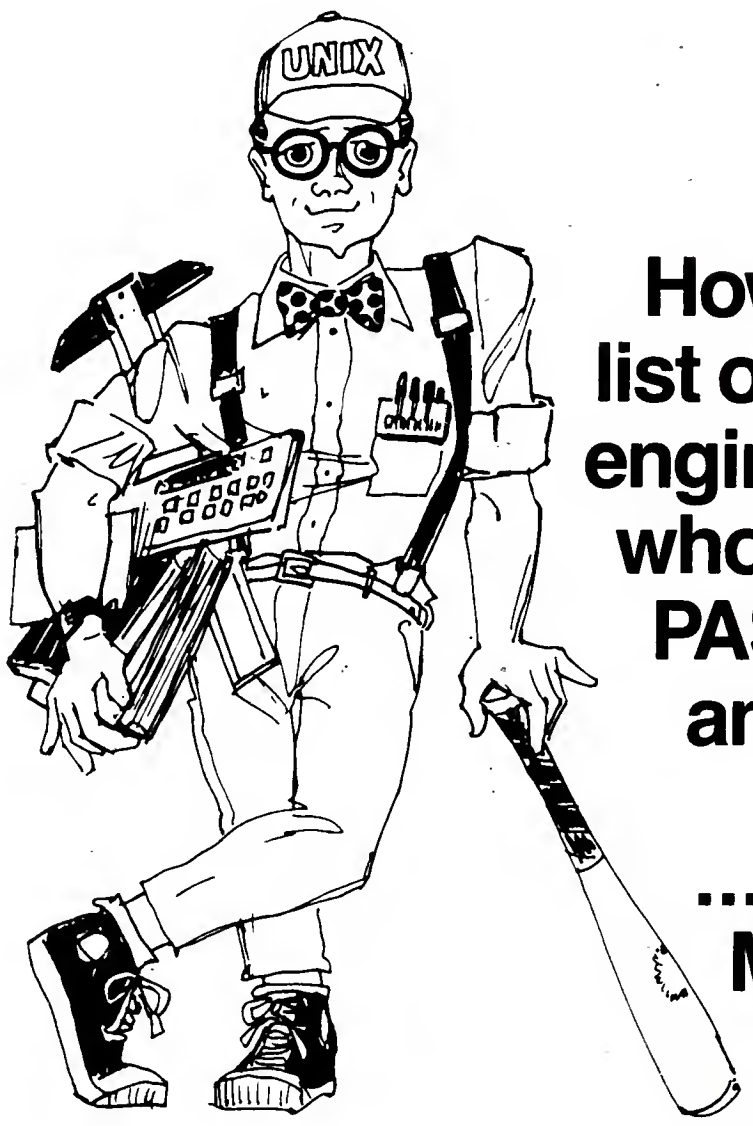
"Every one of our customers has IBM and non-IBM systems," Lee said. "With the merger, we will be able to sell IBM as well as non-IBM systems."

Foley said he expected "substantial incremental sales" when Lee Data's national sales force begins selling his firm's products. He said the two firms are currently discussing the sale of Lee Data's products through Visual Technology's third-party distribution network.

Foley said the proposed merger will fortify Visual Technology's financial base. The planned merger will also serve to strengthen each firm's market position, he said.

Lee said Visual Technology's portable, known as the Commuter, would serve as a "nice entry-level product," in the Lee Data product line. He added that the company planned to integrate Visual's new 2000 system into Lee Data's next generation of 3270 products.

The planned merger calls for the exchange of a half share of Lee Data stock for each share of Visual Technology's 4.9 million shares of outstanding common stock. At Lee Data's closing price on Nov. 9 of $6.85 a share, the transaction is reportedly valued at approximately $16.8 million. The merger is subject to the approval of each company's board of directors as well as each firm's shareholders.



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Profits up at Cullinet

WESTWOOD, Mass. — Cullinet Software, Inc. last week reported second-quarter profits of $5.9 million, or 39 cents per share, up 57% from year-earlier profits of $3.8 million, or 25 cents per share.

For the quarter ended Oct. 31, the company reported revenues of $43.6 million, a 58% increase over the second quarter a year ago when revenues were $27.7 million.

Robert N. Goldman, president and chief operating officer of the company, noted the report represented the 27th consecutive period of increases in both revenues and profits.

Cullinet continues to experience rapid growth in sales of mainframe data base management and applications products and also began shipping its Goldengate microcomputer integrated software package during the quarter, Goldman said.

MAI set to sell Basic Four unit

NEW YORK — Management Assistance, Inc. (MAI) said recently that it has signed an agreement for the sale of its Basic Four Information Systems unit to a company formed by Bennett S. LeBow, a private investor.

The company said the final sale is still contingent upon approval of the purchaser's financing arrangements. "The financing arrangements have progressed sufficiently for us to sign the definitive agreement," the company said in a statement.

LeBow reportedly will pay $30 million in cash and $75 million of debt and preferred stock for the Basic Four unit.

MAI is also in the process of selling its other major segment, the Sorbus Service division, to Bell Atlantic Corp. for $175 million. That sale must be approved by a federal court.

MAI said it has filed a preliminary proxy statement with the Securities and Exchange Commission for the complete liquidation of assets and dissolution of the company following the sale of its two divisions.

HP reports $665 million tax-benefited profit

PALO ALTO, Calif. — Aided by a $118 million tax-change windfall, Hewlett-Packard Co. last week reported fiscal year 1984 profits of $665 million or $2.59 per share, compared with year-earlier profits of $432 million or $1.69 per share.

HP reported an extraordinary tax benefit of $118 million resulting from federal tax law changes earlier this year, which forgave accrued tax liabilities owed by domestic international sales corporations. Discounting the tax benefit, HP said its profits for the year would have increased by 27% to about $654 million or $2.55 per share.

Revenues for the year were $6 billion, a 28% increase over year-earlier revenues of $4.7 billion. For the fourth quarter, the company reported profits of $167 million, or 65 cents per share, up 14% compared with year-earlier profits of $147 million, or 57 cents per share. Revenues for the quarter were $1.6 billion, up 27% from the fourth quarter of 1983 when revenues were $1.3 billion.

The fourth-quarter profits were not particularly strong and HP President and Chief Executive Officer John A. Young said that reflected a competitive environment and discounts and aggressive foreign pricing to help offset the effects of the strong U.S. dollar overseas.

Young also said that while orders in the quarter remained strong, there was a softening of orders in the U.S., which climbed only 13% over year-earlier figures, while international orders rose 39% in the same period.

Datapoint profits plunge

SAN ANTONIO — Datapoint Corp. reported a more than threefold decline in profits for the first quarter, with revenues just barely ahead of year-earlier results.

Profits for the period ended Oct. 27 were $1.5 million, or 7 cents a share, compared with $5.4 million, or 27 cents a share, in the same period a year earlier.

First-quarter revenues were $140.1 million, compared with $139.7 million a year ago.

"Although revenue in the quarter was virtually the same as a year ago, sales revenue in our domestic markets was down substantially from the first quarter last year, reflecting the depressed order rate and lower backlog experienced in the fourth quarter," said Harold E. O'Kelley, board chairman and chief executive officer, in remarks at the company's Nov. 15 annual meeting here.

O'Kelley attributed the lower profits to "slightly lower" gross profit margins, increased engineering and product development costs related to new product introductions and increased marketing costs for international subsidiaries.

O'Kelley said that the continued strengthening of the U.S. dollar overseas had an adverse effect on the company's international business. He said the company plans to expand its product line and to extend its position in local-area network products.

ACRS from page 97

try, which has honed the entrepreneurial spirit to a fine edge by using ACRS and other tax loopholes to finance leases through outside investors who reap the benefits of ACRS and investment tax credits.

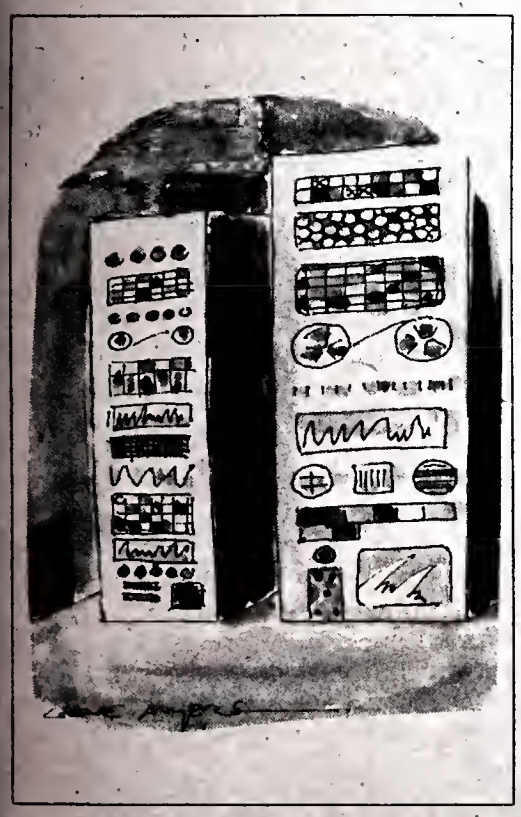
While ACRS is sometimes criticized for favoring older, smokestack industries over high-tech industries, various elements in the computer industry have been arguing that depreciation should be accelerated for computer equipment.

R&D tax credits unlikely

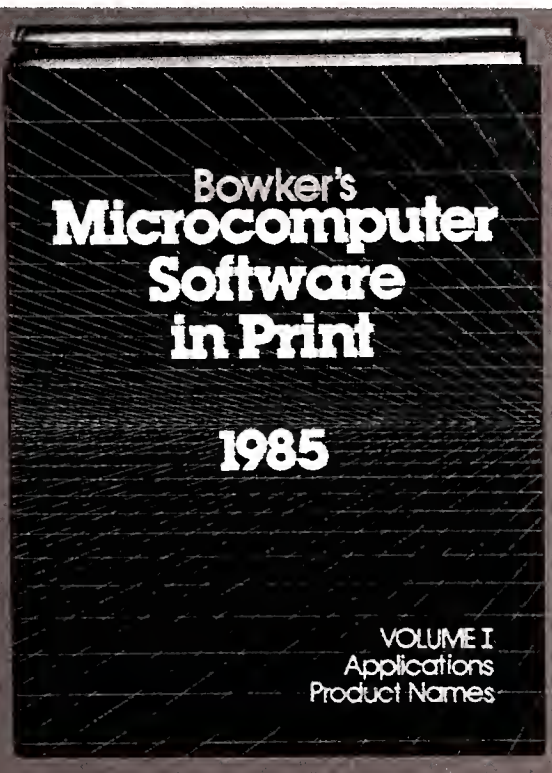
In the current climate, that seems unlikely; what seems even more unlikely is expansion of R&D tax credits.

When the Reagan administration came to Washington, D.C. in early 1981, it was the fragmented coalition of liberals and social groups that howled with fright.

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COMPUTER INDUSTRY

Eagle revenues fall sharply

GARDEN GROVE, Calif. — Eagle Computer, Inc. reported a $2.3 million loss, or 16 cents per share, on sharply lower revenues for the first quarter ended Sept. 29.

In the year-earlier period, Eagle, a maker of IBM-compatible microcomputers, had a profit of $81,000, or one cent per share. Revenues for the latest quarter were $4 million, compared with revenues of $14.2 million a year ago.

Ronald N. Mickwee, Eagle chairman, said the first-quarter results were "as we predicted." He noted that the results showed improvement over the prior two dismal quarters, attributing that to cost-cutting measures taken during the past several months.

The company recently laid off 55 employees, closed its headquarters in Los Gatos, Calif., and moved its operations to its manufacturing plant here.

In the fourth quarter ended June 30, the company reported a staggering loss of $17 million, nearly four times the $4.9 million in revenues it took in during that period.

Although the company's latest revenue figures were still lower than the earlier quarter, Mickwee, referring to the reduction in losses, said, "Our plan continues to work; we've apparently turned the corner."

On a brighter note, the company announced it had received government approval for more than $4 million in desktop microcomputer orders from China.

Eagle said it anticipates approval of additional orders in the near future.

IBM from page 97

cations backlogs of two years in DP departments were slowing growth. Another survey of Fortune 500 companies in 1978 showed the backlog to be four years. IBM was losing revenue because of the bottlenecks, and minicomputer vendors were providing frustrated users with solutions.

The bottlenecks were partly IBM's fault, he added, because the 1978 survey showed that programmers were spending 80% of their time maintaining applications and only 20% of their time developing new applications. "By too frequent operating system releases, IBM was shooting itself in the foot and creating a maintenance problem on its user sites," Lamond said. With on-line programming replacing off-line batch programming and users having access to a data base to run their own applications, the productivity figures have been reversed, Lamond said.

Minicomputer vendors

While DP departments were struggling with two- to four-year bottlenecks, the minicomputer vendors were able to deliver dedicated minicomputers to end users within six months.

This was due in part to DP departments programming on mainframes in Cobol while minicomputer vendors provided customized standard application packages. To help meet the competition, IBM announced programmable small-business minicomputers such as System/36, in addition to the productivity aids, according to Lamond.

"That is the IBM strategy to help you all be more productive, so that you more quickly need more IBM processing power," Lamond said. The productivity aids are in the best interest of users "if your DP programmers cannot keep up with end-user requests for new applications" and if the application backlog is growing, he said.

Alternatives do exist to implementing the productivity aids on a central mainframe, including desktop personal computers or time-sharing with the mainframe, and to implementing on-line, real-time transaction processing, Lamond advised.

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U.S. chip billings declining

SAN JOSE, Calif. — Semiconductor bookings and billings in the U.S. continued their downward trend in October, according to Semiconductor Industry Association statistics.

The association's yardstick of its member companies' health, the book-to-bill ratio, measuring new orders against completed orders, fell to 0.67:1 in October.

A figure of 1.1:1 or 1.2:1 is generally considered good.

The figure includes bookings and billings for semiconductor manufacturers based in the U.S., Europe and Japan.

In October, the association said, semiconductor users continued to reduce inventories accumulated during late 1983 and early 1984, a period of exceptionally high orders.

"While the short-term situation is of great concern to the industry, we believe that the underlying fundamentals of the economy will support continued long-term growth," said association President Thomas D. Hinkelman.

Hinkelman said that the U.S. Department of Commerce has estimated that the electronics industry — the largest consumer of semiconductors — will experience an 18% growth this year and 15% growth in 1985. He said the association believes that purchasing agents for those manufacturers overbought during the first nine months of 1984.

STC from page 97

Ross & Co. in New York, the accounting firm that reportedly helped put the agreement together, said the firm had no comment.

Richard Hastings, an analyst with Merrill Lynch & Co. in New York, said he was not surprised that the loan fell through. "When they first announced [the loan], I thought it definitely wasn't a done deal," he said, adding, "The company is operating under Chapter 11, with numerous creditors having a stake in what's going on. It was a tentative thing from the start."

Even if the $150 million loan had gone through, Hastings said, it would only have bought some time for STC. "I think the problems there are very deep," he added. "I don't expect the company to come out [of Chapter 11] as an independent entity in any shape or form."

Under the agreement with Chemical Bank, the bank would have been given "superpriority" over the company's other unsecured creditors, the largest of which is New York-based Citibank, which is owed $38 million. STC would have paid interest on the funds at 1.5% above the prime interest rate.

Analysts have said STC is likely to be liquidated or acquired if it does not receive significant funds to operate soon.

Pressured by its creditors and in default on most of its bank loans, STC filed for Chapter 11 on Oct. 31. As of Sept. 28, the company owed about $450 million in long- and short-term debt, about $15.7 million of which was secured, according to company financial data.

MSA from page 97

dum," which was sent to 50 interested individuals, Smart said. The memorandum broke the firm down into four separate groups — business software, international sales, educational software and microcomputer distribution — that could be bought separately.

Why did MSA decide to sell Peachtree, which is known for its accounting software designed for the IBM Personal Computer? When MSA purchased Peachtree 3½ years ago, the mainframe software firm hoped to find some "synergism or economies of scale" through the acquisition, Smart said.

But instead, MSA and Peachtree discovered very little overlap between selling mainframe software to executives and selling microcomputer software through retail channels, Smart said.

And Peachtree stopped "acting like a microcomputer software company." The operations of the subsidiary moved into MSA's building in Atlanta and, in the process, were transformed from a low- to a high-overhead firm, Smart said. "Our overhead must have quadrupled since we became an MSA company," he said.

The metamorphosis of Peachtree will include a new emphasis on retail sales. In the past, Smart said, more than 50% of Peachtree's revenues came from sales to hardware companies. While selling software to manufacturers maximized revenues in the short term, it proved to be a poor strategy in the long term: When the personal computer industry stumbled, Peachtree suffered.

But Smart was optimistic about the firm's future. Peachtree has already started to act on plans to revamp the company's strategies, he said. He predicted the company's revenues would reach between $15 and $20 million in 1985 and said the firm, which was not profitable this year, will be profitable next year.

It will not be an easy task though, because in addition to its traditional competitors, Peachtree has a new foe. In September IBM joined the field, announcing its Business Management series of accounting software.

Once a buyer is found, the actual sale could take up to nine months to finalize, Smart said. In the meantime, MSA has not curbed Peachtree's spending or development work, he said.

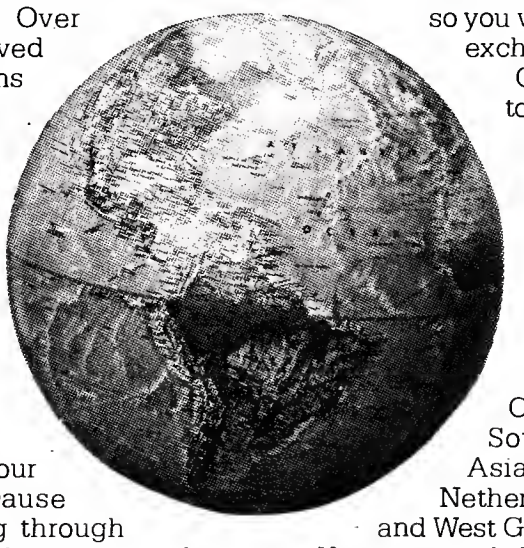
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Responsibilities: The Director oversees all administrative computing operations of the European Division and is responsible for strategic planning to ensure that the European Division continues to provide advanced, high quality administretive computing and office automation; leads the development and implementation of e data network involving distributed computing, micro and minicomputer workstetions; develops applications and coordinates with users of administrative applications including financial, payroll, student records, management information systems; coordinates the overall operetion of the administrative computing services, and other duties as assigned by the Director, European Division. Supervises e staff of ten.

Qualifications: Master's degree; extensive background in computer operating systems and hardware including microcomputing; e thorough understanding of data communications networking; excellent interpersonal communication skills; e record of managerial accomplishment in e full-service computing environment; familiarity with HP hardware. Specific knowledge of 3000 series 68 mini and HP micros is preferred.

Salary: Commensurete with qualifications

Expected Starting Date: February 1, 1985

Application Deadline and Procedure: The deadline is December 17, 1984. Submit e letter of application, professional resume, and the names of three references. Applications received efter the deadline will be considered at the discretion of the Search Committee.

Search Committee, DISAC, c/o Chancellor's Office, The University of Maryland University College, University Boulevard at Adelphi Road, College Park, MD 20742

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We're Hiring Data Processing Professionals

Central and South West is a two plus billion dollar electric utility holding company offering competitive salaries, excellent benefits and stable working conditions. Our Information Services Department, as host center, provides services in a multi-company environment.

Our primary system software is MVS/SPI with JES2. Additionally we use TSO/SPF, COBOL ROSCOE, and Command Level CICS. Our data base is IDMS. We were recently chosen to be one of Cullinet's beta sites for their new development software! We use Cullinet's 4th generation languages—ADS/O, OLM, CULPRIT, etc.

Each of our current openings needs people with proven analytical skills and user interface experience in addition to technical knowledge and abilities.

If we're the type of company you are seeking, and your experience is from a similar environment, please send your resume *and* salary requirements to the Employee Relations Department. Principals only.

Programmer/Analyst
(Business Applications)
Typical project assignments include construction project management, land management system, corporate shareholder system, etc.
Will provide technical expertise in system design, problem determination and system maintenance efforts. Should have JCL skills and online experience (CICS, VSAM) plus exposure to data base concepts.

Sr. Programmer/Analyst
(Engineering Applications)
Multi-project assignments offering multi-company exposure will include CAD/CAM, VM/CMS, transmission design, etc.
Will provide scientific/engineering expertise in system design and implementation efforts. Should have prior scientific/engineering application experience plus IDMS experience.

Programmer/Analyst
(Engineering Applications)
Initial assignment to the mining information management project will result in the development of a total, stand-alone system using state-of-the-art technology.
Will provide online and data base technical expertise in system design and problem determination efforts. Should have related technical skills developed from manufacturing related assignments. IDMS, ADS/O experience important.

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Central and South West Corporation is one of the nation's leading electric utility systems, having annual revenues of more than $2 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

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COMPUTER OPPORTUNITIES

Salt Lake City, Utah

Hercules Aerospace Company, a leader in the areas of solid fuel propulsion systems, development and production of graphite fiber and composite structures, presently has career opportunities for experienced computer professionals.

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BUSINESS PROGRAMMER/ANALYSTS

Candidates should have a BS in a computer related field and a minimum of 2 years experience on large IBM mainframes with emphasis on COBOL, IMS and TSO. Excellent communication skills and the ability to interface with user departments are a must.

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Requires basic knowledge of assembler language and 2 plus years in one or more of the following: MVS/XA, MVS/370, TSO, JES2 and/or IMS. Currently operating MVS/XA on a 3084Q with expansion program to include additional IBM computers.

SYSTEMS PROGRAMMING SUPERVISOR

Requires BS in a computer related field and 5 plus years with large IBM systems (MVS/XA, MVS/370 and/or IMS/VS). Ideal candidate will have management/supervisory experience and a technical degree.

SCIENTIFIC

ELECTRONIC ENGINEERS

BSEE or EET and 2 to 5 years of experience working with control systems to solve automation problems using 68000 or 8080 technology. Experience with assembler and "C" language for mini/micro computers is desirable.

MATH MODELING SPECIALIST

MS or Phd Physics, Math or Computer Science with knowledge in all three areas. Individual will analyze and develop large scale computer simulation systems. Must be skilled in differential equations, 3-D geometry and FORTRAN programming. Mathematical models will be used for filament winding of asymmetric 3-D surfaces with multi-axis winding machines.

PROGRAMMER/ANALYSTS

BS ME, CE, ChemE with capabilities in numerical methods and computer graphics technology. IBM mainframe and FORTRAN experience with graphic language skills desirable. Interactive techniques are used to support engineering design and analysis systems. Familiarity with Apollo work stations would be a plus.

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BS in a technical field with a minimum of 2 years experience in real time applications, data acquisition, laboratory automation or robotic control systems. Individuals should be experienced with DEC PDP-11 RT/RSX operating systems and 68000 technology or have FORTRAN experience on IBM or Honeywell (CP-6) mainframes.

Hercules offers excellent salary, complete benefits and the opportunity for career advancement. Salt Lake City provides abundant recreational and cultural attractions, reasonable housing costs and an exceptional quality of life. If you meet the above qualifications, send a complete resume including salary history to: Al Bakke, (Business) or, Jim Jaquin (Scientific).

HERCULES

Hercules Aerospace Company
Aerospace Division
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Position requires a BS in electrical engineering and a minimum of 2 years programming experience in ALGOL and FORTRAN languages on a mainframe computer. Experience in power system design is preferred. Individual will participate in the conversion of an electrical system from Burroughs to IBM 3081.

Autodrafting Programmer/Analyst

Position requires a BS in computer science or engineering, a good command of FORTRAN and experience on large mainframe. MVS operating systems and experience in graphics is desirable. Responsibillties include using the autodrafting system to support piping engineering in the production of isometrics. This includes daily interface with the Piping Coordinator to detect and identify problems. Will also participate in developing an interactive graphic system for piping engineering application.

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Should have professional certification and B.S. in Computer Science or business related field with minimum of three years EDP Audit experience in an MVS environment utilizing ACF2, TSO, ROSCOE, CICS and IDMS.

Please mail resume and salary requirements to the Employee Relations Department. Principals only.

Central and South West Corporation

P.O. Box 220164 • Dallas, Texas 75222

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DATA PROCESSING OPPORTUNITIES

Juneau and Anchorage, AK

DATA BASE ADMINISTRATOR
Salary: $47,500 to $52,000/year plus benefits

The State of Alaska has a current vacancy located in Juneau. This is a supervisory position with responsibility for the development, analysis, design control and management of the State of Alaska data base systems.

Minimum qualifications are: three years of data base management systems experience on a system equivalent in size and complexity to IBM, IMS, Total Systems 2000, RAMIS, IDMS, or ADABAS, including one year of experience equivalent in kind and level to Data Base Specialist with the State of Alaska. **PLUS** three additional years of computer programming and/or systems analysis experience.

Note: The State's DBMS is ADABAS and preference is given to applicants with ADABAS experience.

DATA BASE SPECIALIST
Salary: $43,500 to $47,500/year plus benefits

Open recruitment in underway in order to find additional qualified candidates in the event of future openings. Positions are located in Juneau and Anchorage, and perform the full range of data base requirements in support of user activities. These include DBMS design, definition, organization, security, efficiency, documentation, generation, long term requirements, and operational guidelines.

Minimum qualifications are: two years of data base management system experience at a level equivalent to Systems Analyst II, EDP Programmer IV, or Systems Programmer II with the State of Alaska on a system equivalent in size and complexity to IBM, IMS, Total Systems 2000, RAMIS, IDMS, or ADABAS.

One year of experience listed above must have been in the analysis and design of data base applications and/or data base administration. **PLUS** at least three additional years of computer programming and/or systems analysis experience.

Send official State application or resumes to: Recruitment Coordinator, Pouch C-0201, Juneau, AK 99811.

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State of Alaska

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MIDDLE SOUTH SERVICES is currently involved in several projects including large scale IMS DB/DC systems development. The current hardware environment consist of IBM 3084, 3081, MVS/XA, 4381 VM, and Tandem. We have the following excellent career opportunities:

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ANALYST/PROGRAMMER (SCIENTIFIC) Requires previous experience in scientific applications with a sound knowledge of PL-1 or Fortran. Computer applications development with exposure to a VM operating system would be helpful.

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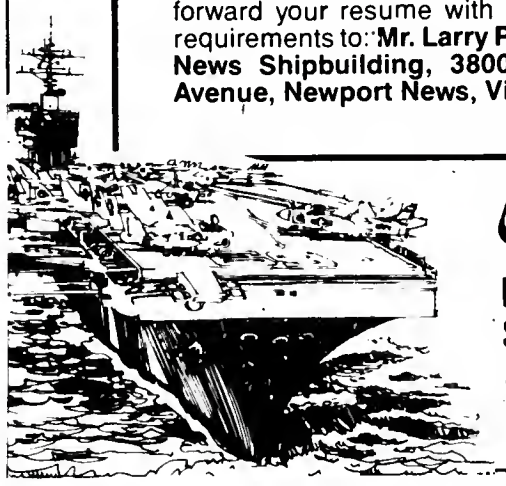
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The Associate Director of University Computing for Administrative Systems, reporting to the Director of University Computing, is broadly responsible for the development and oversight of university-wide administrative and management information system plans, policies, and priorities. Specific responsibilities include: administrative & management information system planning, policy, and priority development; administration and management of major university data base; oversight and review of administrative and management information system hardware and software acquisitions; and various administrative and management information system consultative services to administrative units at all levels within the University.

Minimum requirements are a Masters degree in management information systems and data base administration and management, and a minimum of six years experience in progressively responsible planning, policy making, and administrative and management information system position or the equivalent combination of education and experience. Experience in higher education, experience in dealing with the problems and opportunities inherent in the administration and management of a complex University; familiarity with data processing and office automation equipment and commercially available administrative software; and the capability of communication effectively and providing leadership in a comprehensive, decentralized educational environment preferred. Qualified applicants may be considered for academic tenure.

Deadline for receipt of letter of application, including minimum acceptable salary, and resume is December 14, 1984, but may be extended if additional applicants are necessary. Send to: Lou Procter, Campus Employment Office, East Maxwell Street, University of Kentucky, Lexington, Kentucky 40506-0314.

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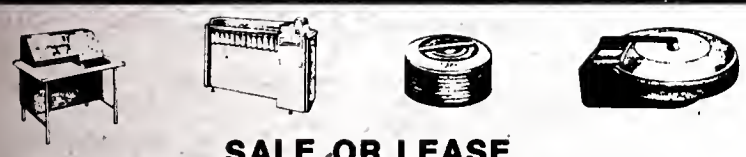
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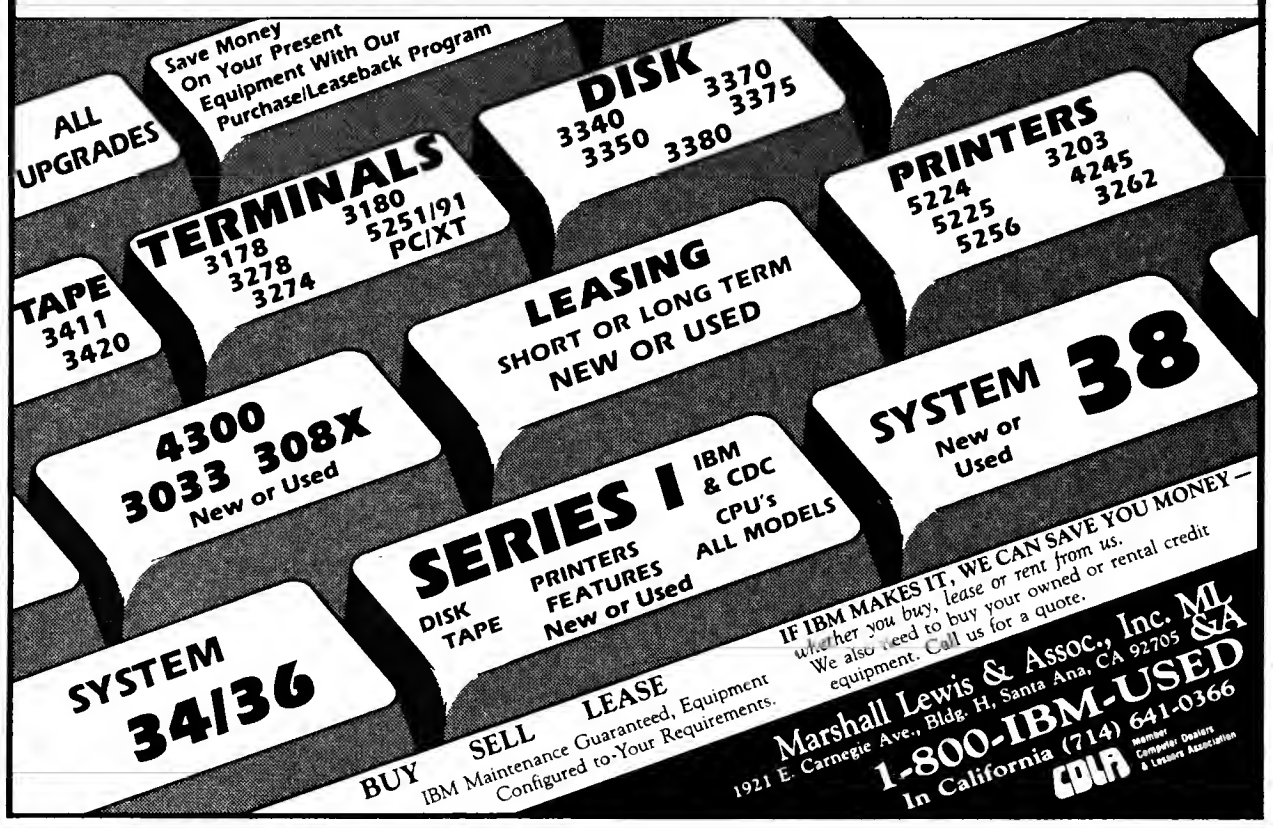
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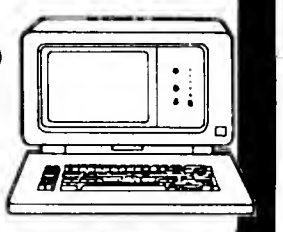
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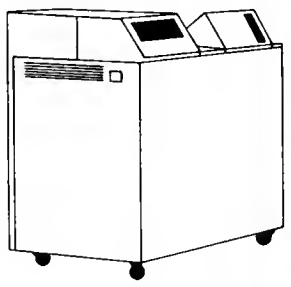
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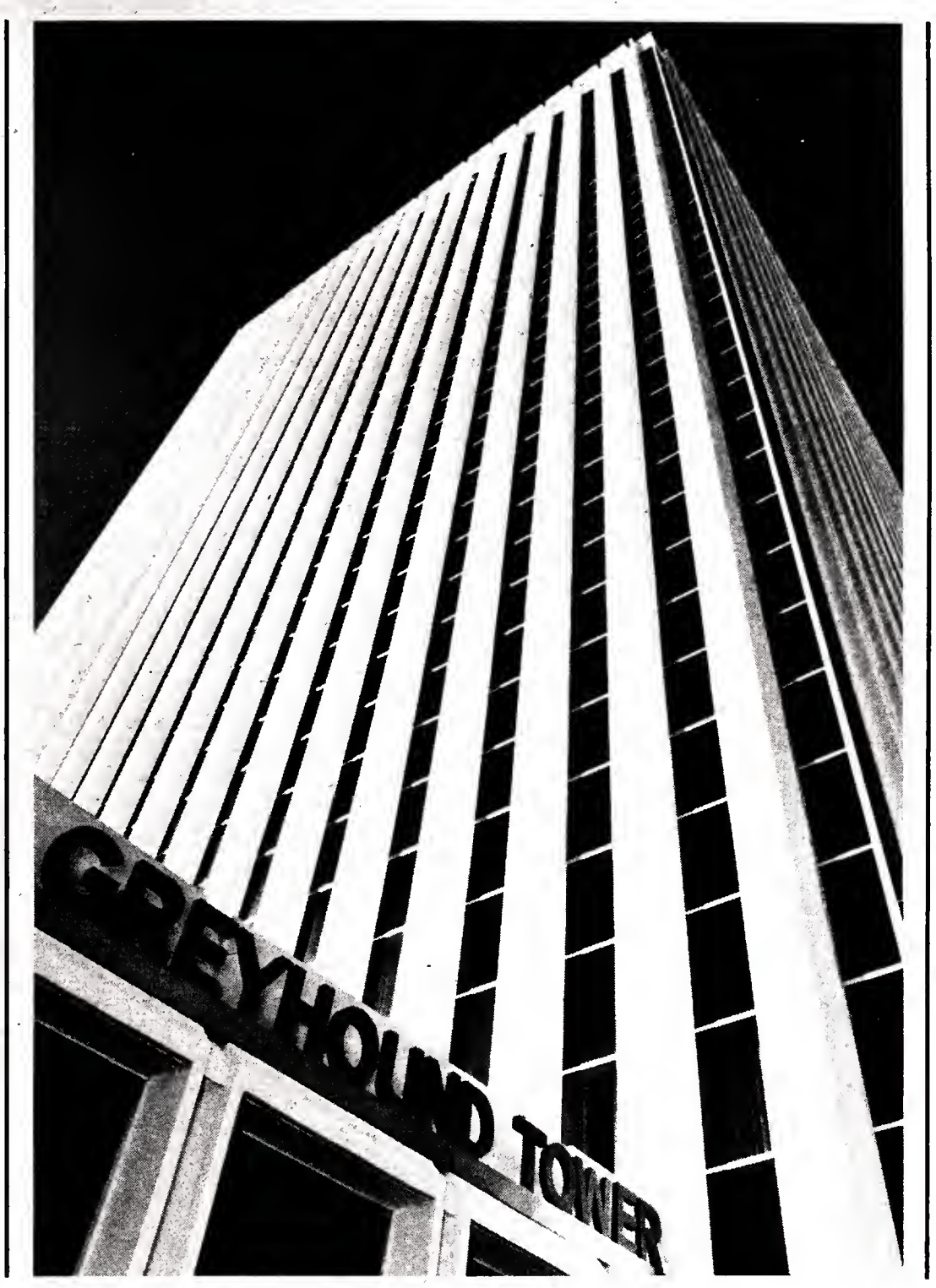
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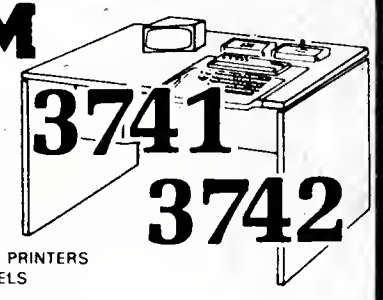
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ADVERTISERS INDEX

ADR 3
AGS Management Systems 28
Alex Brown 6,64
American Computer Group 99
AT&T Information Systems 104-105
AT&T Technologies 50-51,ID/9

B I Moyle & Associates Inc. 4
Bell & Howell ID/31
Boeing Computer 88
Burroughs ID/7
Business Software Inc. (BSI) 18

Candle Concepts 65
Centron DPL 78
CGA Software 16-17
Cincom ID/28-ID/29
CLA 53
Codex SR/19
Collier-Jackson, Inc. 10
Columbia Data ID/25
Comnet '85 69
Computer Associates ID/20
Computer Corporation of America 38-39,64
Computer Management Research 108
Computer Source 98
Computer Systems Research 36
Computer Techniques 10
Computer Technology Group 32
Continental Resources ID/26
Control Concepts SR/18
Control Data Corp. 74-75
Corodale 44
CORS, Inc. 54,106
CTS Datacom SR/30
Cullinet 19,ID/11
CWCI 108,109
CW Enterprise 62
CW Focus SR/33
CW NASA 72-73
CW Saudi ID/6
CW Subscription 85
CW Sweden 80

D & B Computing Services 26,31,33
D B M S Inc 29
Database Design, Inc 70-71
Data Encore ID/32
Datapoint SR/9
Dataware Systems Leasing ID/24
Davis, Thomas & Associates 24
Davox Communications SR/23
DCA/Microcomp Division 66-67
DEC/ Corporate Marketing 101-103
Deltak, Inc. 86
Digital Communications Assoicates SR/22
Digital Controls Corp. SR/18

D.J.C. Corp. ID/23
Dow Jones News ID/30

Equitable Life Leasing SR/38
Exxon Office Systems ID/22

Falco Data SR/26
Fibronics SR/10
Fisher Innis 63
Forte Data Systems 46-47
Fusion Products ID/30

General Datacomm Industries, Inc. 52-53,83
General Electric 14-15
General Research Corporation ID/9
Genesys Software 27
Genigraphics Corp. 100
GRID Systems Corp. 22

Hambrecht & Quist 28
H & W Computer Systems 30
Hermes International 68
Hewlett-Packard SR/15
Honeywell Information Systems ID/1

IBM ID/19,87
ICCS 80
Informatics 79
Innovative Software 12-13
Interface Systems SR/28

J.W. Lampi, Inc. 104
Lear Siegler SR/16
LeeMah ID/10
Levi, Ray & Shoup 60
Local Data SR/32

Manufacturing Technology, Inc. 34-35
Mathematica 49
MCBA ID/15
Michaels, Ross & Cole 14
MicroFrame 23,ID/21
MicroRim 98-99
MIM SR/27
Mitron 7
Multiplications 76

NameLab Inc. 100
NCR Corp. SR/25
NCR-ADDS 56-57
NCR-PC SR/37
Netec ID/31
Network Systems 82
Northern Telecom ID/14,SR/4-SR/5
Northrop ID/8

Panasonic SR/29
Paradyne SR/6

Philon Inc. 40
Phoenix Leasing ID/24
Pinzone & Associates ID/10
Polaroid 45
Prime Computer ID/4-ID/5,90-91
Professional Computer Research 60

Quality Micro Systems 96
Questronics 94

Racal Vadic ID/12-ID/13
Radio Shack 48
RCA/DCP SR/24
Realia Inc. ID/18
Rolm Corp. SR/20-SR/21
R.R. Bowker Co. 107
RT/Katek Communcations 92

Santa Clara Systems, Inc. 61
SAS Institute 24,SR/12-SR/13
Sharp SR/7
Signal Technology Inc. 37,84
Software A G 93,95
Software Engineering of America 18
Software Results 18
Startech Software Systems 23
Syncsort 5
Sys-ed 11

Tandem Computers 20-21
Teletype Corp. 25
Televideo Terminals 41
Telex SR/36
Teltone Corp. SR/11
Term-Tronics ID/6
Texas Instruments 55
Tone Software 11
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Unicalc 11
Unilogic 11
USL Data Systems 23,24

Ven-Tel 138
Virtual Microsystems SR/8
VM Software, Inc. 9

Wang Laboratories 42-43
Wyse Technology SR/31

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Yates Ventures ID/25

Zaisan ID/16
Zentec SR/34

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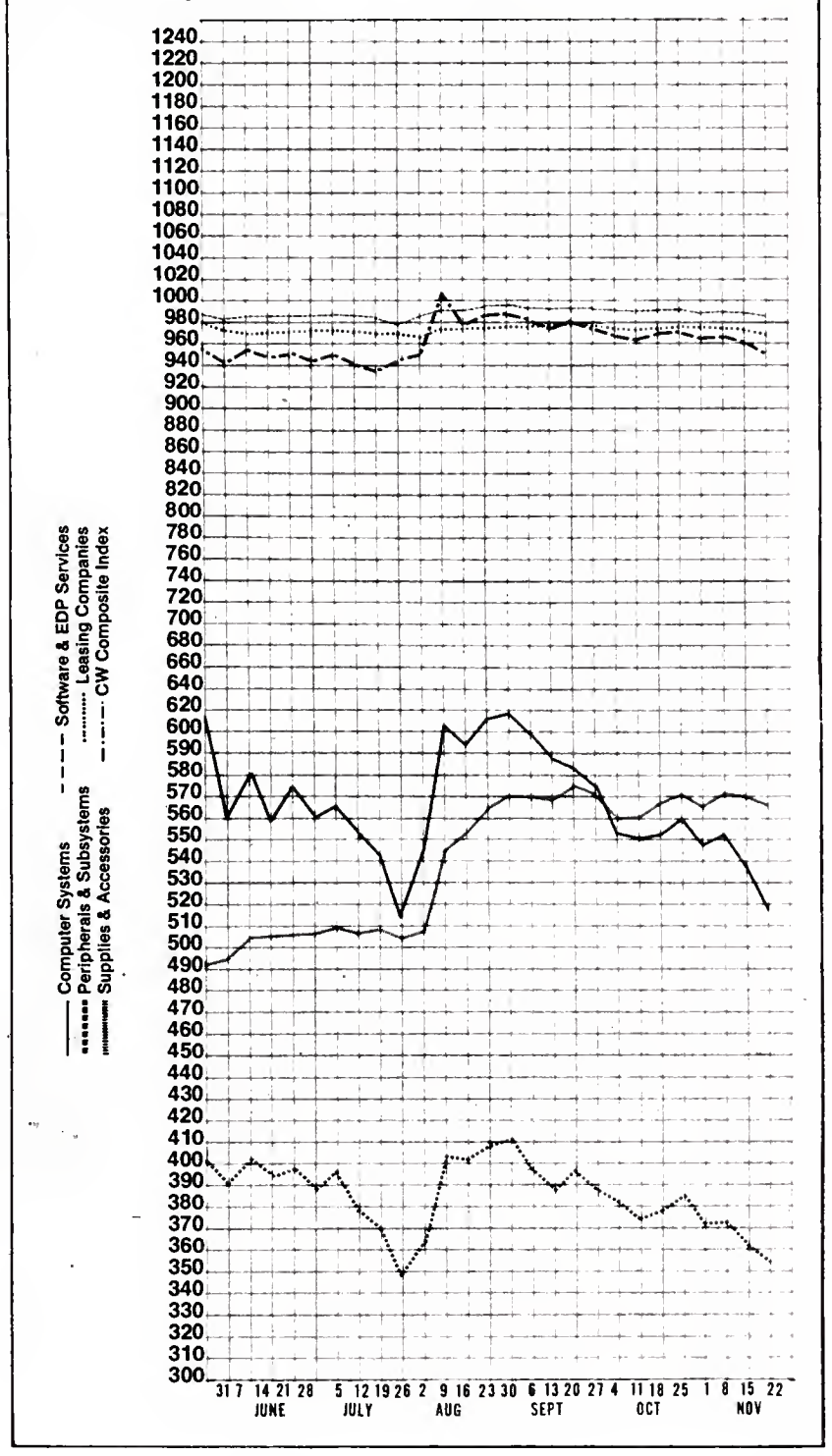
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Computerworld Stock Trading Index



Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES MONDAY, NOVEMBER 19, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass 02139

E X C H		1983-84 RANGE (1)	CLOSE NOV 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	7- 24	7 1/2	0	0.0
O	ALTOS COMPUTER SYST	8- 21	8 1/2	- 5/8	-6.8
A	AMDAHL CORP	10- 30	10 3/8	- 1/2	-4.5
O	APPLE COMPUTER INC	18- 63	21 7/8	-1 7/8	-7.8
N	AT&T	15- 21	18 3/8	- 3/8	-2.0
N	BURROUGHS CORP	44- 59	53 1/2	-1	-1.9
O	COMPAQ COMPUTER CP	4- 15	4 3/4	- 1/4	-5.0
O	COMPUTER AUTOMATION	4- 17	4 1/8	- 3/4	-15.3
A	COMPUTER CONSOLES	8- 26	8 1/8	- 3/4	-8.4
N	CONTROL DATA CORP	25- 62	34 7/8	-2	-5.4
O	CONVERGENT TECHNOL	6- 41	6 1/8	- 7/8	-12.5
N	CRAY RESEARCH INC	39- 58	50 1/2	-1 1/2	-2.8
O	DAISY SYSTEMS CORP	14- 28	24 1/2	+ 1/2	+2.0
N	DATA GENERAL CORP	27- 59	53 1/4	-1 3/8	-2.5
N	DATAPOINT CORP	14- 31	14 3/8	- 3/8	-2.5
N	DIGITAL EQUIPMENT	64-125	101 1/4	-3 1/2	-3.3
A	EECO INC	12- 16	13 1/2	- 1/8	-0.9
N	ELECTRONIC ASSOC.	3- 15	3 1/2	0	0.0
N	FLOATING POINT SYST	13- 44	16 7/8	- 1/8	-0.7
N	FOXBORO	28- 47	30 1/2	- 1/2	-1.6
O	GENERAL AUTOMATION	6- 16	5 1/2	- 3/8	-6.3
N	GOULD INC	21- 44	21 1/2	- 1/2	-2.2
N	HARRIS CORP	23- 49	28 1/2	+1 5/8	+6.0
N	HEWLETT-PACKARD CO	31- 48	32 1/8	-1 7/8	-5.5
N	HONEYWELL INC	46- 69	56 1/2	-1 1/2	-2.5
N	IBM	103-134	120	-3 1/8	-2.5
O	IPL SYSTEMS INC	2- 14	1 3/4	0	0.0
N	ITT CORP	21- 47	26	-1	-3.7
N	M/A-COM INC	13- 35	17 3/8	- 3/8	-2.1
N	MANAGEMENT ASSIST	9- 29	27	- 1/4	-0.9
N	MATSUSHITA ELEC(ADR)	58- 88	57 1/2	+4	+7.4
N	MODULAR COMPUTER SYS	6- 16	6 5/8	- 3/8	-5.3
N	MOHAWK DATA SCI	9- 17	10 1/4	+ 1/4	+2.5
N	MOTOROLA INC	29- 49	34 1/8	- 1/2	-1.4
N	NAT'L SEMICONDUCTOR	11- 20	11 1/4	-1	-8.1
N	NBI INC	16- 36	16 1/8	- 7/8	-5.1
N	NCR	21- 34	25 5/8	- 5/8	-2.3
N	PERKIN-ELMER	18- 37	24 1/4	- 7/8	-3.4
N	PRIME COMPUTER INC	11- 26	16 1/4	- 1/4	-1.5
N	SPERRY CORP	35- 50	37 1/4	- 5/8	-1.6
O	STRATUS COMPUTER INC	9- 17	9 1/4	0	0.0
O	TANDEM COMPUTERS INC	15- 40	17 1/8	- 3/4	-4.1
N	TANDY CORP	24- 62	24 5/8	0	0.0
O	TELEVIDEO SYSTEMS	3- 41	3	- 1/4	-7.6
O	TELXON CORP	8- 17	16	0	0.0
N	TEXAS INSTRUMENTS	101-169	121 3/8	- 1/2	-0.4
A	ULTIMATE CORP	15- 24	14 3/4	-2 1/8	-12.5
O	VECTOR GRAPHICS INC	0- 9	1/8	-	-24.8
A	WANG LABS "B"	24- 42	26 7/8	- 1/4	-0.9
A	WANG LABS "C"	24- 42	27 1/4	- 1/8	-0.4
N	XEROX CORP	35- 52	36 3/8	-1	-2.6
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	10- 22	20 3/4	- 1/4	-1.1
A	CMI CORP	4- 10	6	- 3/8	-5.8
N	COMDISCO INC	10- 42	11 1/4	- 3/4	-6.2
O	CONTINENTAL INFO SYS	5- 16	7	- 1/2	-6.6
N	OPF INC	10- 16	15 1/2	- 1/2	-3.1
O	FINALCO GROUP INC	4- 12	4 1/2	-1 1/2	-25.0
O	PHOENIX AMERICAN INC	4- 17	4	-1	-20.0
O	SELECTERM INC	10- 21	9 1/2	-1	-9.5
N	U.S. LEASING	29- 44	36 3/8	- 5/8	-1.6
	COMPONENTS				
N	ADVANCED MICRO DEV	25- 41	29	-1	-3.3
O	ADV'D SEMICONDUCTOR	16- 38	16	- 1/2	-3.0
N	ANALOG DEVICES INC	20- 32	22 7/8	+ 1/4	+1.1
O	ANALOGIC CORP	10- 31	11 3/4	- 1/2	-4.0
N	APPLIED MAGNETICS CP	9- 37	9 1/8	- 1/2	-5.1
O	HADCO CORP	6- 12	6 3/4	- 1/8	-1.8
O	MICRO MASK INC	10- 19	10 3/8	0	0.0
N	TERADYNE	23- 39	23 1/8	-1 5/8	-6.5

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

E X C H		1983-84 RANGE (1)	CLOSE NOV 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	2 1/8	+ 1/8	+6.2
N	ADVANCED SYSTEMS INC	13- 22	13	-1 1/4	-8.7
O	AGS COMPUTERS INC	10- 32	10	-1	-9.0
O	AMERICAN SOFTWARE	13- 31	13	- 1/4	-1.8
N	ANACOMP INC	2- 19	2	0	0.0
O	ANALYSTS INTL CORP	5- 17	4 3/4	- 1/2	-9.5
A	APPLICO DATA RES	18- 37	27 1/2	+ 1/2	+1.8
O	ASHTON TATE	6- 15	6 1/2	- 1/2	-7.1
O	ASK COMPUTER SYSTEMS	13- 21	16	0	0.0
B	ASTRODYNE COMP IND	1- 7	1 1/2	0	0.0
N	AUTOMATIC DATA PROC	30- 44	36 5/8	- 3/8	-1.0
O	COMPUTER ASSOC INT'L	15- 35	17	- 3/4	-4.2
O	COMPUTER HORIZONS	8- 20	6 1/4	- 3/8	-5.6
O	COMPUTER NETWORK	5- 11	8 5/8	- 1/8	-1.4
N	COMPUTER SCIENCES	11- 23	13 7/8	0	0.0
O	COMPUTER TASK GROUP	12- 19	15	0	0.0
O	COMPUTER USAGE	5- 18	4 3/4	- 3/8	-7.3
O	COMPUTONE SYSTEMS	4- 23	7 1/4	-1 1/8	-13.4
O	COMSERV CORP	1- 16	3 3/8	+ 1/8	+3.8
O	COMSHARE	7- 14	6 3/4	- 3/8	-5.2
N	CULLINET SOFTWARE	24- 50	40 7/8	+ 3/8	+0.9
O	CYCARE SYSTEMS INC	16- 25	20	+ 1/2	+2.5
O	HOGAN SYSTEM INC	9- 27	9 1/4	0	0.0
N	GENERAL ELECTRIC CO	45- 59	56 1/4	- 7/8	-1.5
N	GTE CORP	36- 48	38 5/8	-1 1/2	-3.7
N	INFORMATICS GENERAL	15- 32	15 5/8	- 1/2	-3.1
O	INFORMATION SCIENCE	5- 17	5 1/4	0	0.0
O	INFOTRON SYSTEMS CP	23- 43	23 1/4	-1	-4.1
O	KEANE ASSOCIATES	6- 15	10	-2	-16.6
A	LOGICON	18- 31	26	-2 1/4	-7.9
O	LOTUS DEVELOPMENT CP	15- 40	21	-1 1/2	-6.6
O	MCI COMMUNICATIONS	6- 28	7 3/8	- 5/8	-7.8
O	MNGT SCI AMER INC	9- 33	10 1/4	0	0.0
O	MATHEMATICAL APP GRP	6- 18	8 1/2	0	0.0
O	MICOM SYSTEMS INC	31- 50	33 1/4	- 3/4	-2.2
O	MICROPRO INT'L CP	3- 10	2 3/4	0	0.0
O	NATIONAL DATA CORP	8- 26	7 3/4	- 1/4	-3.1
O	ON-LINE SOFTWARE INT	6- 29	5 1/2	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	13	+1 1/8	+9.4
N	PLANNING RESEARCH	10- 21	9 3/4	- 3/8	-3.7
O	POLICY MGMT SYSTS CP	22- 35	24 3/8	+ 1/8	+0.5
O	PROGRAMMING & SYS	4- 8	4 1/2	0	0.0
O	REYNOLDS & REYNOLD	28- 53	31 1/4	-2 3/4	-8.0
O	SEI CORP	11- 34	13 1/2	+ 1/4	+1.8
O	SHARED MEDICAL SYST	23- 43	23 1/2	- 5/8	-2.5
O	SCIENTIFIC COMPUTERS	5- 14	5 1/4	- 1/4	-4.5
O	SOFTWARE AG	9- 15	14 3/8	- 5/8	-4.1
N	URS CORP	10- 18	12 3/8	- 3/8	-2.9
N	UCCEL	7- 17	11 1/8	-1 1/8	-9.1
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	2 3/4	- 1/8	-4.3
A	ANDERSON JACOBSON	4- 26	4	- 1/4	-5.8
O	AUTO-TROL TECHNOLOGY	8- 29	8 1/2	+ 1/4	+3.0
O	AVANT-GARDE COMPUTNG	15- 29	20	0	0.0
O	BANCTEC INC	5- 22	6 3/4	+ 1/2	+8.0
A	BEEHIVE INT'L	1- 15	5/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	20	0	0.0
O	CAMBEX CORP	1- 3	1 7/8	- 1/8	-6.2
N	CENTRONICS DATA COMP	8- 28	9	- 5/8	-6.4
A	CETEC CORP	7- 12	7 1/4	- 5/8	-7.9
A	COGNITRONICS	4- 20	4 1/8	0	0.0

E X C H		1983-84 RANGE (1)	CLOSE NOV 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUGRAPHIC CORP	26- 40	27 5/8	- 3/8	-1.3
O	COMPUTER TRANSCEIVER	1- 10	5/8	-	-8.2
N	COMPUTERVISION CORP	29- 53	39 3/4	0	0.0
N	CONRAC CORP	11- 24	14 3/8	+ 1/2	+3.6
A	DATAPRODUCTS CORP	15- 32	16 1/4	- 1/2	-2.9
A	DATARAM CORP	4- 12	4 1/4	- 1/8	-2.8
O	DATA SWITCH CORP	6- 41	5 3/4	-1	-14.8
O	DATUM INC	5- 17	5 1/8	- 3/8	-6.8
O	DECISION DATA COMPUT	9- 16	10 5/8	- 1/8	-1.1
O	DOCUTEL-OLIVETTI	5- 39	5	- 1/8	-2.4
N	ELECTRONIC M & M	5- 11	6	+ 1/8	+2.1
O	ENDATA, INC	7- 16	7	- 3/4	-9.6
O	EVANS & SUTHERLAND	12- 50	12 3/8	0	0.0
O	GANDALF TECHNOLOGIES	9- 14	13 1/8	- 1/8	-0.9
N	GEN'L DATA COMM IND	10- 20	17 5/8	- 1/2	-2.7
N	HAZELTINE CORP	16- 33	28 3/4	- 5/8	-2.1
O	ICOT CORP	3- 8	3 3/4	- 1/4	-6.2
O	INFORMATION INTL INC	10- 19	11 1/4	0	0.0
O	INTECOM INC	7- 21	9 1/4	- 3/8	-3.8
O	INTEL CORP	27- 45	27 3/4	-1 1/4	-4.3
A	LUNDY ELECTRONICS	7- 19	9	- 1/8	-1.3
O	MEGADATA CORP	8- 15	12 1/2	- 3/8	-2.9
A	MSI DATA CORP	9- 25	9 1/8	- 3/8	-3.9
N	NASHUA CORP	19- 29	25 5/8	0	0.0
O	NETWORK SYSTEMS CORP	16- 34	22 7/8	+ 1/8	+0.5
N	NO AMERICAN PHILIPS	30- 40	36 1/8	- 7/8	-2.3
N	NORTHERN TELECOM LTD	30- 49	36	- 7/8	-2.3
O	OMEX	1- 6	1/8	0	0.0
N	PARADYNE CORP	11- 26	14 3/8	- 1/8	-0.8
A	PENRIL CORP	9--14	12 3/8	+ 7/8	+7.6
N	PLESSEY CO (ADR)	25- 41	25 3/4	-2 1/2	-8.8
O	PRINTRONIX INC	16- 34	18 1/2	- 1/2	-2.6
O	RAMTEK CORP	5- 23	5	-1	-16.6
N	RECOGNITION EQUIP	10- 17	13 3/8	- 1/2	-3.6
N	ROLM CORP	30- 80	68 3/8	- 1/2	-0.7
N	SANDERS ASSOCIATES	36-120	36	-1 3/4	-4.6
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	9- 19	11 5/8	- 1/8	-1.0
N	SCIENTIFIC ATLANTA	8- 23	9 3/8	+ 1/8	+1.3
O	SEAGATE TECHNOLOGY	5- 20	4 5/8	0	0.0
N	STORAGE TECHNOLOGY	3- 23	2 7/8	- 3/8	-11.5
O	SYKES DATATRONICS	1- 13	1 3/4	+ 3/8	+27.2
O	SYSTEMS & COMP TECH	20- 39	24 1/4	-1 1/4	-4.9
A	T BAR INC	7- 17	7 1/8	- 3/8	-5.0
A	TAB PRODUCTS CO	13- 20	16 1/4	- 1/4	-1.5
O	TANDON CORP	7- 35	6 3/4	- 1/8	-1.8
A	TEC INC	6- 12	8 7/8	- 1/4	-2.7
N	TEKTRONIX INC	52- 87	57 1/4	- 5/8	-1.0
N	TELEX	19- 35	31 1/4	- 3/4	-2.3
O	TESDATA SYSTEMS CP	2- 17	2	- 1/4	-11.1
N	TIMEPLEX INC	13- 23	18 3/4	+1	+5.6
O	VISUAL TECHNOLOGY	3- 26	2 3/4	+ 1/8	+4.7
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 23	21 1/8	+ 1/8	+0.5
N	BARRY WRIGHT	22- 33	27	- 1/4	-0.9
A	DUPLEX PRODUCTS INC	22- 27	26 1/4	- 1/4	-0.9
N	ENNIS BUS. FORMS	18- 28	23 3/4	0	0.0
N	3M COMPANY	69- 90	79 7/8	-2 1/8	-2.5
N	MOORE CORP LTD	35- 51	44 1/2	- 3/8	-0.8
O	STANDARD REGISTER	27- 43	41 1/2	0	0.0
N	WALLACE COMP SERVICE	23- 33	29 3/4	0	0.0

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